

December, 1950

# MODERN Machine Shop



**HARDINGE**  
ELMIRA, N.Y.

## HIGH SPEED PRECISION LATHE

*Featuring:*

Hardened and Ground Steel Dovetail Bed Ways

Three Point Mounting

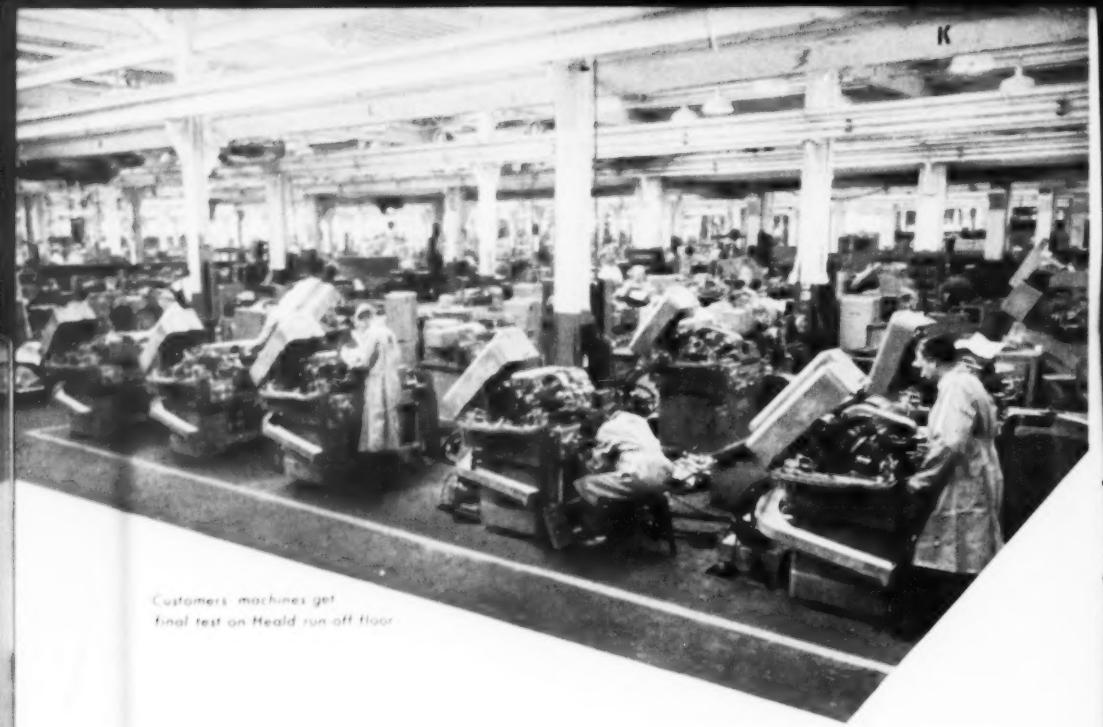
Center Drive Headstock

Full Bearing Tailstock Spindle

Patented Positive Lock Compound Slide Rest

Index Slide Has Hardened and Ground Steel Top

*For complete information, write HARDINGE for Bulletin DV59.*



Customers' machines get  
final test on Heald run-off floor.

# starting point\*

*for a thousand production lines*

\* Yes—precision production lines the world over have had their beginning right here!

For this is the Heald run-off floor, where every machine is put through its paces before shipment—turning out exactly the same parts it will handle on the customer's production line, at the same high production rates and the same close tolerances for size, finish, accuracy and precision.

The practically unlimited variety of work

that's handled here is a pretty good measure of Heald versatility. For whatever your precision finishing job, it's neither too large nor too small, too simple or too complex to warrant the full Heald treatment—engineering, manufacturing, run-off testing, installation, training your operators, and friendly, helpful service throughout the life of the machine.

Remember—when it comes to precision finishing, it pays to come to Heald.

**THE HEALD MACHINE COMPANY**

WORCESTER 6, MASSACHUSETTS



Branch Offices: Chicago • Cleveland • Dayton • Detroit • Indianapolis • Lansing • New York

HOWARD CAMPBELL  
Editor

FRED W. VOGEL  
Managing Editor

ROBERT I. SHORE  
New Equipment Editor

C. W. HINMAN  
GILBERT C. CLOSE  
Contributing Editors

GENE J. SCHWARBER  
Advertising Manager

NORMAN S. ROGERS  
Art Director

A. J. WALKER  
Circulation Manager

**ADVERTISING REPRESENTATIVES**

RICHARD S. KLINE  
GEORGE E. HAY  
431 Main St., Cincinnati 2  
MAin 0182

G. M. FILLMORE  
342 Madison Ave., New York 17  
Murray Hill 7-7390

CHARLES H. DEILY, JR.  
351 Mattison Avenue  
Ambler, Pennsylvania  
Ambler 0335

JOHN M. KRINGS  
Tribune Tower, Chicago 11  
DElaware 7-5441

THE ROBERT W. WALKER CO.  
684 S. LaFayette Park Place  
Los Angeles 5  
DUnkirk 7-4388  
68 Post Street, San Francisco 4  
SUtter 1-5568

Member

**CCA**



**NBP**

Published monthly and  
copyrighted (1950) by

GARDNER PUBLICATIONS, INC.  
431 Main St., Cincinnati 2, Ohio

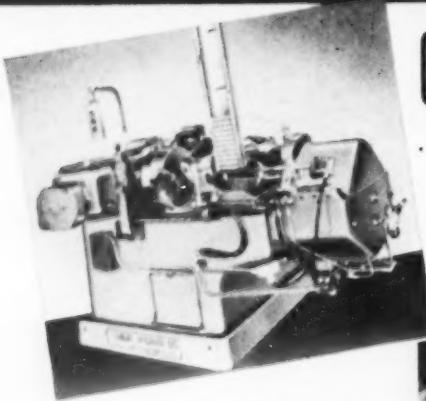
Printed in U. S. A.

Acceptance under Section 34.64,  
P. L. & R. Authorized

# MODERN Machine Shop Contents

Features in This Issue .....	89
Magnetic Tracing—A Flame Cutting Production Aid .....	90
By H. G. Frommer	
Tooling for More Production .....	120
By Frank Charity	
Simplified Plant Equipment Lubrication .....	128
By Gilbert C. Close	
Handling Work on Circular Dials .....	138
By C. W. Hinman	
Trimming Body Skins of Stratotests .....	150
By Howard E. Jackson	
Equipment Plus Technique Speeds Wheel Turning Job .....	158
By Bartlett West	
How Fisher Body Solves Some Materials Handling Problems .....	174
By E. R. Frost	
Modern Equipment at Work .....	
Finish Broaching of Military Engine Parts .....	190
Swager Saves Materials and Cuts Production Time in Producing Textile Machine Spindles .....	191
Automotive Plant Uses Special Machine Tool to Produce Parts .....	192
Carbide Dies Solve Manufacturing Problem .....	196
Rotary Straightener Removes "Bow" from Drawn Tubing .....	200
Fast Setup for Drilling Cross-Holes .....	202
Ideas from Readers .....	
Special Tailstock Center for Long, Heavy Pipe and Tubing .....	206
By Irwin Mansfield	
Shop-Made Spline Gage .....	206
By W. M. Halliday	
Lathe Adapted as Winding Machine .....	212
By Ira S. Roberts	
Unique End Mill .....	214
By Fred V. Williams	
Auxiliary Drives for Screw Machines .....	216
By Howard E. Jackson	
Simple Method for Flaring Ends of Tubing .....	222
By John E. Hyler	
News of the Industry .....	228
New Shop Equipment .....	296
Services Directory .....	322
"Where to Get It" .....	324
Over the Editor's Desk .....	330
Cartoon .....	332
Index to Advertisements .....	334

# A REVOLUTIONARY NEW DEVELOPMENT



The LANDIS Automatic Close Nipple Threading Machine, recently perfected by Landis Thread Engineers, will produce commercial standard close, short, and special short nipples at rates up to 625 per hour. These machines are built in two sizes—one for  $\frac{1}{2}$ " to  $\frac{3}{4}$ " nipples—the other for 1" to 2" nipples.

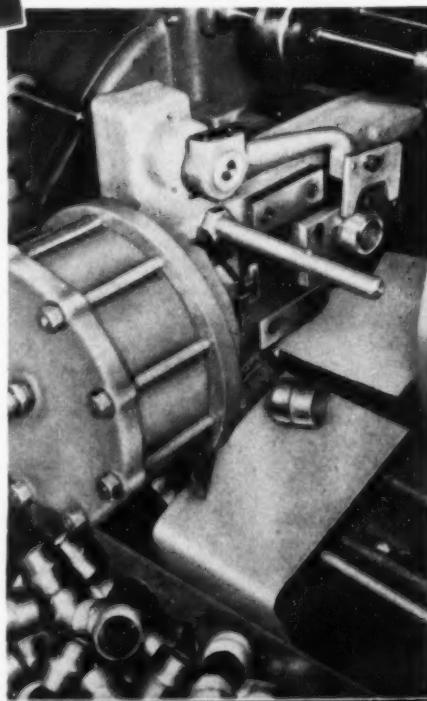
The Close Nipple Machine is completely automatic—threading, reaming and chamfering close nipples on both ends without manual handling. Nipple blanks are fed from a magazine, transferred automatically from one carriage to the other, and ejected when finished.

Tremendous savings in labor cost can be realized—PLUS other savings through lower tool cost and increased production. The operator is required only to fill the magazine and give supervisory attention. Thus a SINGLE operator can handle TWO OR THREE LANDIS Close Nipple Machines, depending on the pipe size.

New construction features contribute to longer life and more efficient operation. Special built-in safety devices guard against damage from jams and ease the supervisory job of the operator. Write today for complete information.

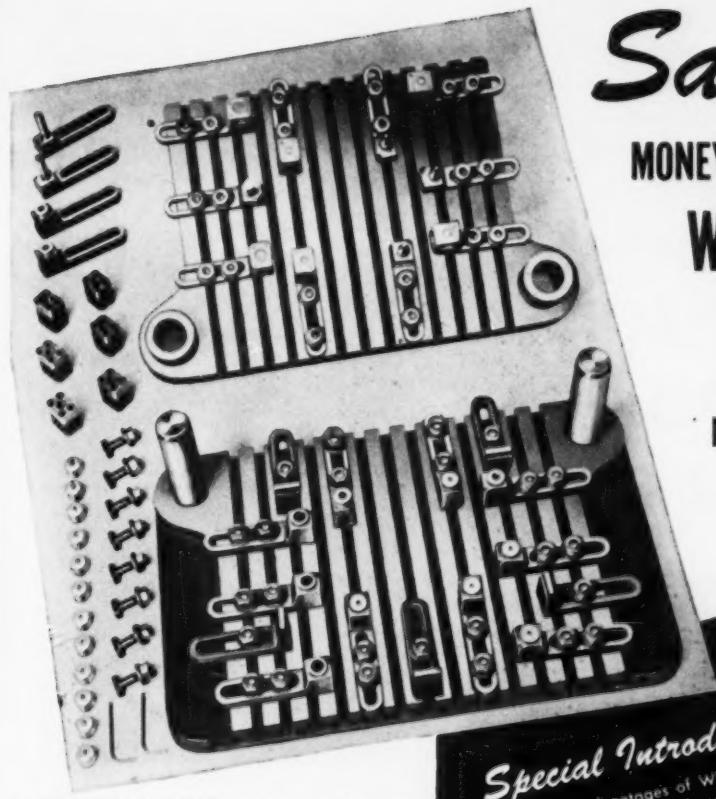
## Close & Short Nipples ... threaded in one automatic operation

Formerly the production of close and short nipples was featured by high labor cost, low output and tedious manual handling. NOW . . . here is a modern machine tool which mass produces these nipples in a single continuous automatic operation.



# LANDIS Machine CO.

WAYNESBORO  
PENNA., U.S.A.



*Save* TIME AND  
MONEY WITH THIS NEW  
**WHISTLER**  
**U-375**  
ADJUSTABLE  
PERFORATING  
DIE SET

A MONEY-SAVING opportunity to prove in your own plant the many advantages of Whistler Adjustable Dies. Now being employed by thousands of metal working shops. The compact design of this special U-375 unit (10" x 12" working surface) provides up to 25 holes,  $\frac{1}{32}$ " to  $\frac{3}{8}$ " diameter. Pierce materials up to and including  $\frac{1}{16}$ " mild sheet steel...in one operation. Minimum centers of  $\frac{7}{8}$ " are permitted. Set-ups are made quickly and into production within hours. Precision perforating on long or short runs at much reduced expense. Re-use of punches and dies writes off first cost. The U-375 unit is shipped complete ready for immediate set-up.

*Special Introductory Offer*

To prove the advantages of Whistler Adjustable Dies under your production conditions, we are offering these U-375 units at a special low price.

- 1 DS-1012-1 (10" x 12")
- 1 Slotted Die Set
- 12 DR-375 Die Retainers
- 12 PR-375 Punch Retainers
- 12 PU-375 Round Punches
- 12 DBU-375 Die Bushings
- 12 S-375 Strippers
- 12 LLP-375 Locating Pilots
- 4 GA-375 Standard Gouges
- 1 SUP-375 Set-Up Plug

Punches and dies are your own selection of sizes from  $\frac{1}{32}$ " up to  $\frac{3}{8}$ " diameters. Everything needed to start production is included.

Shipped complete upon receipt of your order for only

**\$280**

NET F.O.B. BUFFALO, N.Y.

◀ **SENT FREE ON REQUEST**—Special U-375 Booklet and General Catalogs. In brief informative style, with clear-cut illustrations, this literature gives complete details about Whistler Adjustable Dies. Write today.



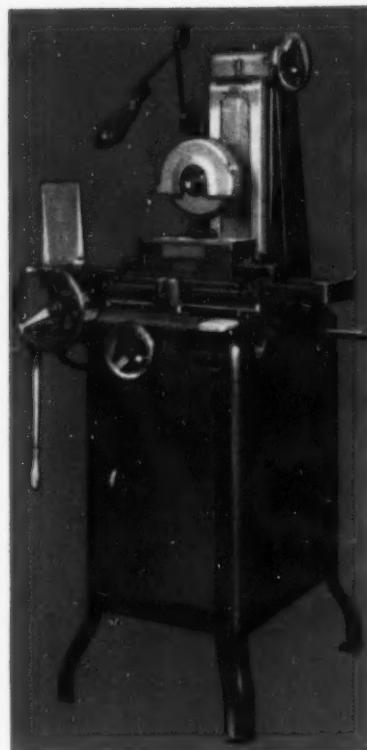
**S. B. WHISTLER  
& SONS, Inc.**

740 MILITARY ROAD • BUFFALO 17, NEW YORK

**Proven  
Superior!**

## **BOYAR-SCHULTZ** **MODEL 6-12** **SURFACE GRINDER**

**Invites  
Comparison**



Saves more than 20% in time on small jobs

### **COMPARE:**

#### **PERFORMANCE —**

Flat, accurate surface finish—precision vertical spindle control—fast, easy longitudinal and cross feed operation—less operator fatigue

#### **MANUFACTURE —**

High alloy castings—precision parts—ground thread screws—protection against abrasive wear—accurate, long wearing ways—high precision smooth running spindle—needle bearings on all hand wheels—precision assembly

#### **APPEARANCE —**

A small machine with big machine accuracy and performance—fits into any shop—streamlined for easy maintenance—sturdy cabinet

#### **COST —**

Big machine performance, small machine cost—more value for your tool dollar

**BOYAR-SCHULTZ CORPORATION**

**2112 Walnut Street, Chicago 12, Illinois**



**HEAVY DUTY  
SINGLE REDUCTION UNIT**

*Let us help you  
solve your  
**SPEED REDUCER  
PROBLEMS***

Farrel speed reducers incorporate the experience gained in the solving of innumerable problems requiring considerable pioneering in gear engineering. The result is a wide range of types that are standard in principal features, but adaptable in critical detail.

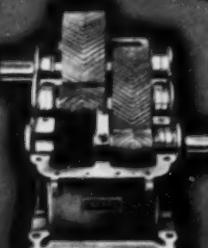
All units have precision gears; shafts and bearings factored to safeguard against interruption of vital processes; heavy-section cases with joints sealed to keep out dust and dirt. But, that is not all. The design of these units permits an engineering freedom in proportioning gears, shafts, bearings and even some housing dimensions to meet specific requirements. This flexibility has resulted in the solution of innumerable application problems.

*Send for a copy of Bulletin 449.*

**FARREL-BIRMINGHAM CO., INC., ANSONIA, CONN.**  
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.  
Sales Offices: Ansonia, Buffalo, New York, Boston,  
Pittsburgh, Akron, Cleveland, Detroit, Chicago, Los  
Angeles, Tulsa, Houston, New Orleans

**Problem:**  
A gear unit to transmit  
calculated load of 100 HP  
from a 125 HP, 1750 RPM  
motor to induced draft fan  
at 290 RPM, continuous  
24-hour service.

**Solution:**  
Equivalent HP =  $100 \times$   
1.50 (service factor) = 150  
Ratio =  $1750 \div 290 = 6.03:1$   
Tabulated data in Bulletin  
No. 449 shows SR-137 unit  
to be correct size for this  
application.



**DOUBLE REDUCTION UNIT**



Yes . . . you may select your required taps from a complete line of Hanson-Whitney standard styles and sizes and still get "something special."

And by "special" we do not mean extra-cost, made-to-specification taps. We mean standard extra quality "finished" taps, ground after hardening to give you the keenest cutting edges, the highest accuracy in lead, angle and diameter. All customary sizes in Hand Taps, Machine Screw, Nut, Tapper, National Hook, Pulley, and Pipe Taps are stocked for fast shipment in protective, clear-labeled, cartoned boxes. For maximum tap life and maintained accuracy, specify H-W.

HANSON-WHITNEY COMPANY • HARTFORD 2, CONN.  
DIVISION OF THE WHITNEY CHAIN COMPANY

**Hanson**  
**Whitney**  
PIONEERS OF FINISHED TAPS

# Faster PRODUCTION



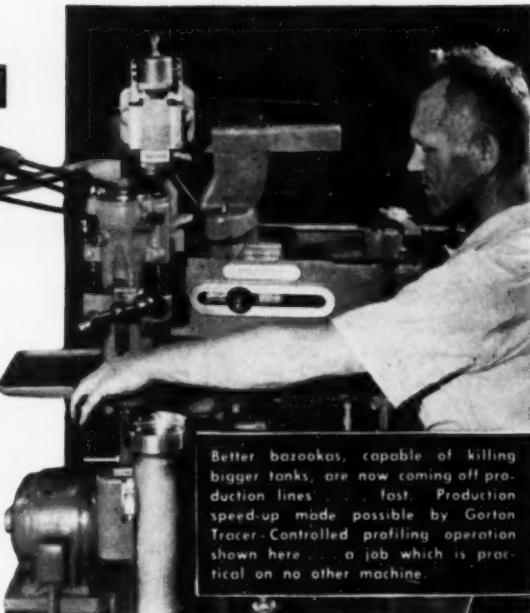
**GORTON**  
*Tracer-Control*

## • SPEEDS PRODUCTION • CUTS COSTS

On many all-but-impossible jobs, Gorton Tracer-Controlled Pantographs and Duplicators speed up production on military or industrial contracts. High surface finish results from spindle speeds up to 45,000 R.P.M. Accuracy results from the use of over-size masters, patterns, or templates together with the reduction ratio which is exclusively characteristic of the pantograph. Whether a dozen or a thousand pieces, each is identical to the first. Work piece size varies from instrument parts to areas of 10 to 20 feet.

Gorton tracer-controlled equipment quickly pays for itself in profiling, routing, die sinking, mold cutting, counterboring, chamfering, grooving, graduating, engraving as well as many other standard or special operations on ferrous or non-ferrous metals and plastics where work is flat, uniformly curved, cylindrical, spherical or irregular in shape.

Mail the coupon below for General Catalog illustrating the complete Gorton line.



Better bazookas, capable of killing bigger tanks, are now coming off production lines . . . fast. Production speed-up made possible by Gorton Tracer-Controlled profiling operation shown here . . . a job which is practical on no other machine.

## PRODUCTION DATA—

**JOB:** Profile 6 locking lugs for male and female sections of new 3.5" Bazooka

**MATERIAL:** Aluminum alloy

**CUTTER:** 5/32" dia. single flute, fast spiral H. S. steel running at 3,900 R.P.M., without coolant

**MASTER:** 2 masters: one for male and one for female sections; 3 times oversize, traced manually

**HOLDING FIXTURE:** Pneumatic-operated internal expanding type

**APPROX. TIME:** 36 pieces per hour

**ALTERNATE METHODS:** None practical

Please send at once complete information about the Gorton line contained in Bulletin 1655-1712.

Firm \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

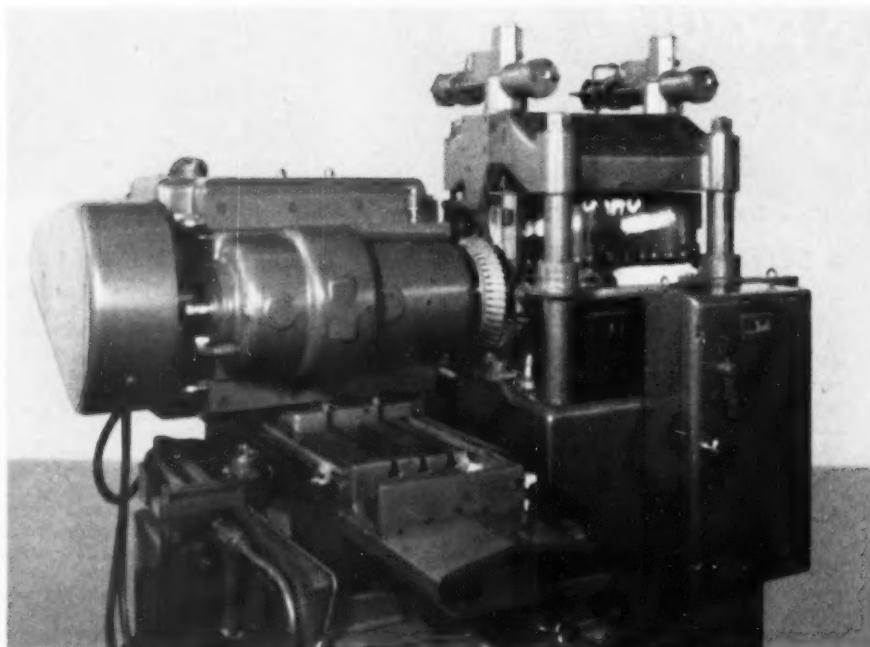
Address \_\_\_\_\_

City, State \_\_\_\_\_



# *Interchanging the Spindle Head and Fixture*

**REDUCED THE COST OF  
CYLINDER BLOCK MILLING OPERATION**



Familiar units comprise this CINCINNATI special purpose miller. In this view, a cylinder block is clamped in position for the milling operation.

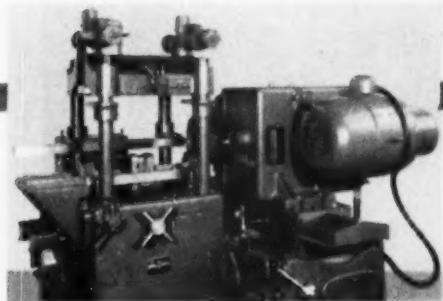


CINCINNATI

# CINCINNATI

Unorthodox procedures sometimes work out to advantage. In this example, the work and cutter spindle head have been interchanged for an accurate milling operation on cylinder blocks. A lower unit cost resulted, and here are the reasons why. ¶ The machine, basically a CINCINNATI No. 3-24 Hydromatic Miller, is equipped with a spindle carrier of a High Power Dial Type mounted on the table, and a "dummy" headstock which incorporates a conveyor height fixture. To reduce physical effort for the operator, the fixture is pneumatically operated. A 12" diameter sintered carbide cutter takes the cut at 25" per minute. ¶ As you might suspect, this adaptation is the work of Cincinnati Application Engineers. These men are expert at taking standard units of CINCINNATI Milling Machines and putting them together with a minimum of special work to build up single purpose equipment to meet your requirements. You can be sure of justifying your replacement policy with Cincinnati handling your milling problems. May we hear from you? Write to Department E. S.

### THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO



Operator's working station, showing comparative simplicity of CINCINNATI special purpose miller.

#### PRODUCTION DATA

Part Name .....	Cylinder block
Material .....	Cast iron
Operation .....	Mill flywheel end square with crankshaft bearing
Cutting Speed .....	300 feet per minute
Feed .....	25" per minute
Production .....	30 per hour

#### THE CINCINNATI HYDROMATIC LINE:

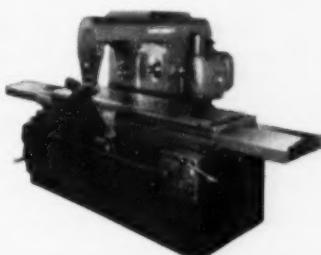
Plain and Duplex styles, conventional and tracer controlled types, 18 sizes of each, 24" to 90" table traverse, 10 hp to 50 hp drive, standard and complementary unit construction for flexibility in building single purpose machines. No. 5-60 Plain Machine illustrated at right.

Plain Hydromatic, Catalog M-1670

Duplex Hydromatic, Catalog M-1670

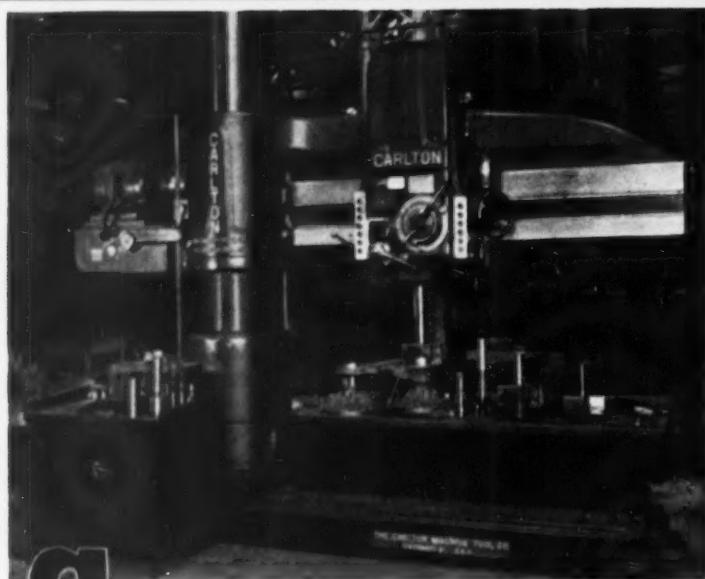
Plain Tracer Controlled Hydromatic, Catalog M-1602

Duplex Tracer Controlled Hydromatic, Catalog M-1602



# NATI

MILLING MACHINES • CUTTER SHARPENING MACHINES  
BROACHING MACHINES • FLAME HARDENING MACHINES  
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID



# C arlton's the favorite for intricate radial jobs

The George J. Meyer Mfg. Co., Cudahy, Wisc., selected a Carlton 4-A radial, added ingenious tooling of their own . . . and came up with an efficient combination for drilling, boring, turning and facing the housing of a bottle washing machine. The intricacy of a job like this calls for the

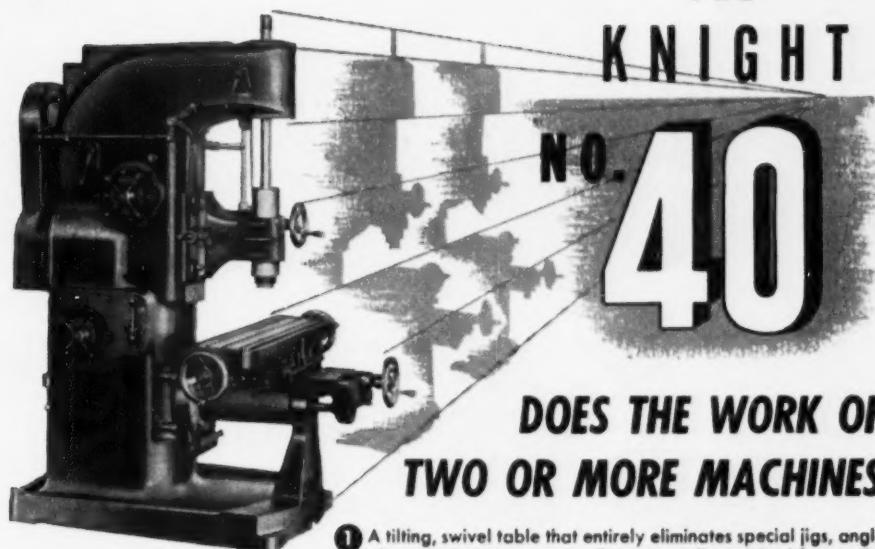
rigidity of a Carlton. This and other "plus values" such as ease of operation and precision performance are Carlton standards.

Carltons can simplify your radial problems, too. For information on the best model and size, send us your requirements today.

**THE CARLTON MACHINE TOOL CO.**

CINCINNATI 25, OHIO





# THE KNIGHT NO. 40

## DOES THE WORK OF TWO OR MORE MACHINES

*Here's Why-*

- ① A tilting, swivel table that entirely eliminates special jigs, angle plates and other expensive fixtures usually required for special or complicated milling, boring or shaping jobs.
- ② Exceptional capacity and flexibility make it easy for the Knight No. 40 to do jobs which often require transfers to two or more special machines.
- ③ Sixteen table and spindle feed changes plus four vertical spindle feeds allow the use of a wide range of cutting tools.
- ④ Correctly located full vision controls for direction, speeds and feeds provide the most in convenient, simple operation.
- ⑤ Heavy, strong, one-piece column casting, wide accurate bearings and precision gearing insures the rigidity which means absolute accuracy and long service life.

*Mail The Coupon Today For Catalog*

**W.B.KNIGHT**  
MACHINERY COMPANY



3920 WEST PINE BLVD.  
ST. LOUIS 8, MISSOURI

MORE GOODS for MORE PEOPLE at LOWER COST

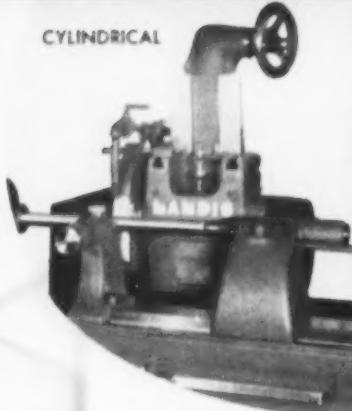


W. B. KNIGHT MACHINERY CO., 3920 West Pine, St. Louis  
Send catalog on Knight No. 40 and other milling  
machines.

Name \_\_\_\_\_

Title \_\_\_\_\_

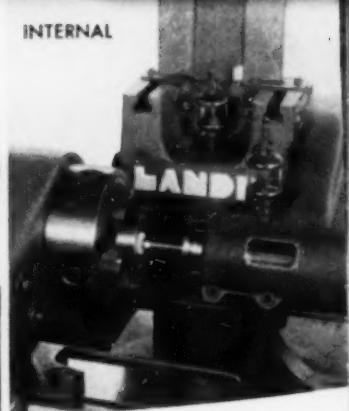
CYLINDRICAL



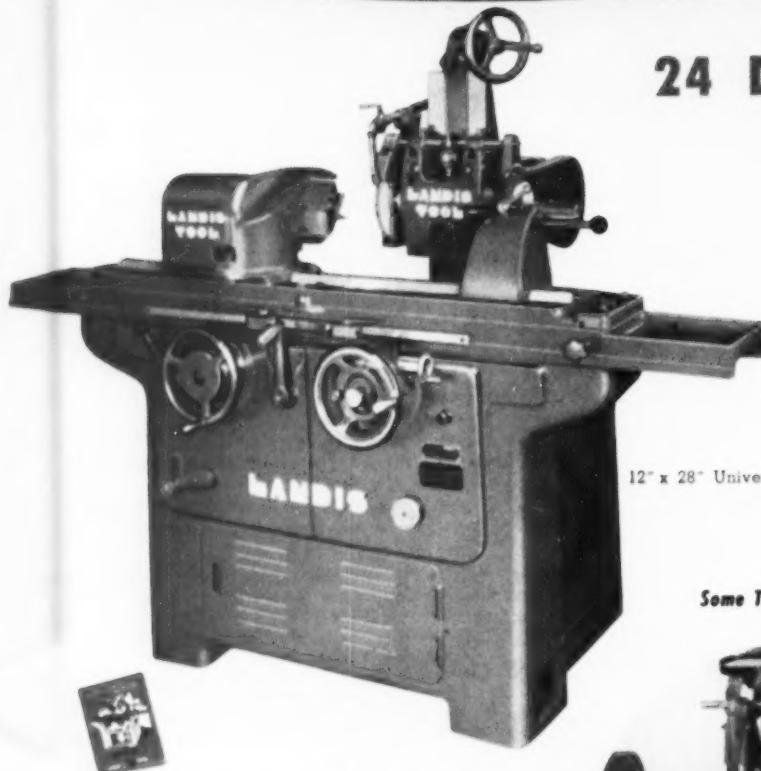
FACE



INTERNAL



## 24 DIFFERENT



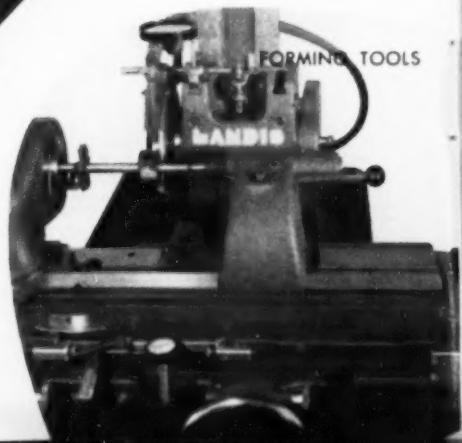
12" x 28" Universal and Tool

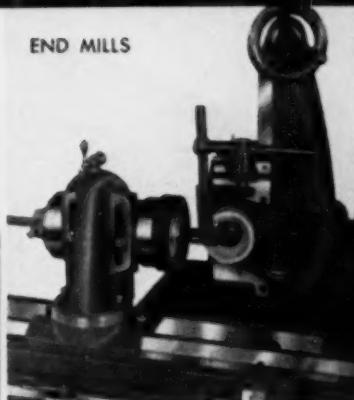
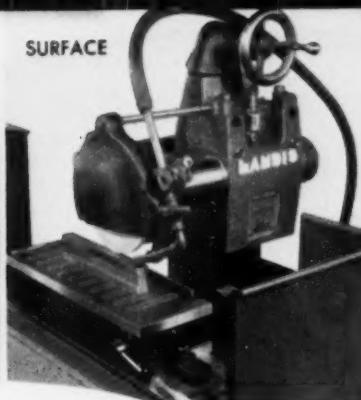
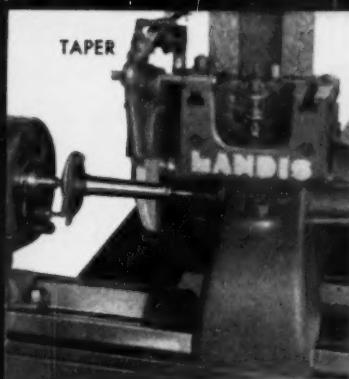
### Some Typical Setups



24-page catalog K45 gives full information and specifications of standard equipment and optional extra accessories for tool room and small shop work.

**LANDIS TOOL**  
*Precision Grinders*





#### ANGULAR CUTTERS

## GRINDING OPERATIONS

with versatile **LANDIS TOOL**  
12" x 28" universal and tool grinder

#### With Standard Equipment

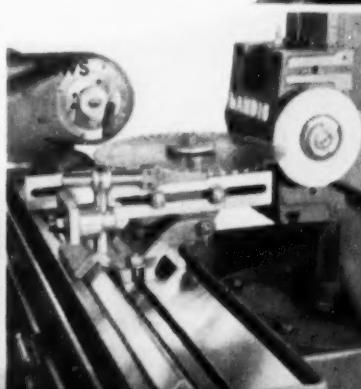
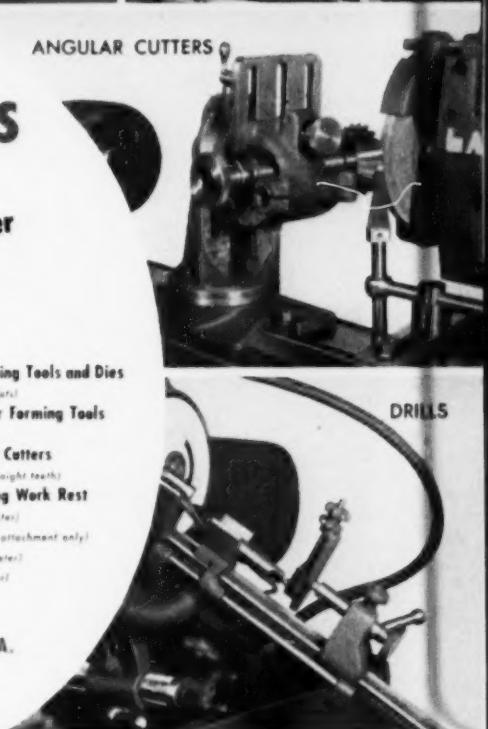
1. Cylindrical
2. Taper
3. Face
4. Surface (operations without attachments only)
5. Clearance on Saws, Cutters and Reamers
6. Flutes on Taps
7. Face of Teeth on Formed Cutters
8. Spiral Mill Grinding

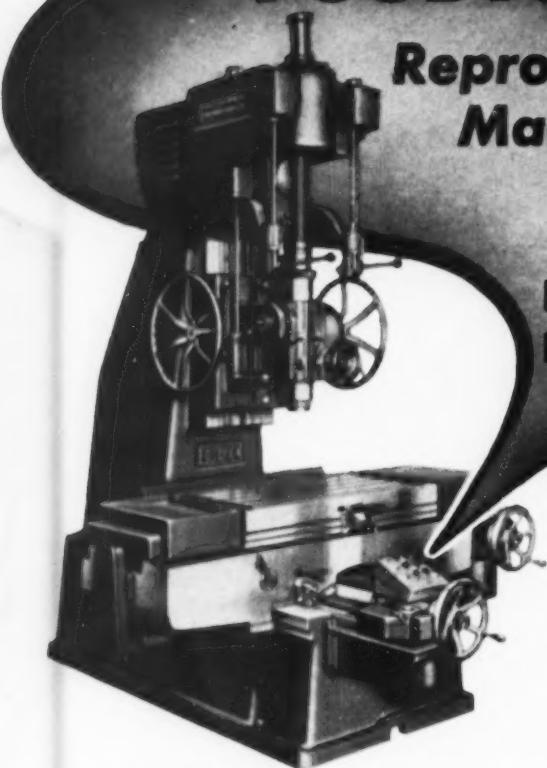
#### With Optional Accessory Equipment

9. Milling Cutters
10. Wet Grinding

11. Dry Grinding
12. Internal Grinding
13. Hobs (right or left hand)
14. Parallel Blocks, Flat Forming Tools and Dies
15. Surface Grinding (quantity jobs)
16. Screw Machine and Other Forming Tools
17. Angular Wheel Face
18. Reamers, Taps and Form Cutters
19. Gear Cutter (stepped or straight teeth)
20. Cylindrical Work Requiring Work Rest
21. Face Mills (up to 10 $\frac{1}{2}$ " diameter)
22. End Mills (with taper holding attachment only)
23. Drills (from 1/32" to 1 $\frac{1}{4}$ " diameter)
24. Saws (from 7 $\frac{1}{2}$ " to 26" diameter)

LANDIS TOOL COMPANY / WAYNESBORO, PENNA., U. S. A.





# FOSDICK

## Reproduction Machine

with  
**AUTOMATIC  
PUSH-BUTTON  
POSITIONING**

NEW AUTOMATIC POSI-  
TIONING UNIT PROVIDES  
FLEXIBLE MACHINE CA-  
PABLE OF BORING OR  
DRILLING DUPLICATE  
WORK WITH SPEED AND  
ACCURACY.

This new No. 42P reproduction machine with automatic table positioning makes possible a plus or minus .0001" accuracy merely by pressing a button on the control panel conveniently located at operator's position. Two electrical cycles then quickly bring table to the desired position. Push buttons for rapid traverse in and out, right and left are provided and safety switches protect machine in all directions.

This new machine eliminates expensive boring and drilling jigs—no longer is your product design frozen because of high jig costs. New design, special parts, frequent changes are now handled with ease.

Production is increased and simplified through the use of duplicating bars made quickly on the machine itself from  $\frac{5}{8}$ " square stock.

Increase, improve, modernize your production with the new Fosdick 42P machine with automatic Push-Button control.

*Folder and complete catalog sent gladly upon request. Catalog Number MMSJP.*

# FOSDICK

MACHINE TOOL CO.  
CINCINNATI 23, OHIO

**CUSTOM  
MADE  
at NO  
EXTRA  
CHARGE**

*Jarvis*

**TECNI-TAPS**

**JARVIS  
POWER  
TOOLS**

TAPPING ATTACHMENTS  
TECNI-TAPS  
ROTARY FILES  
FLEXIBLE SHAFTS and  
QUICK CHANGE CHUCKS and COLLETS

THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT



ACCURATE  
SQUARES

CONCENTRIC  
SHANKS

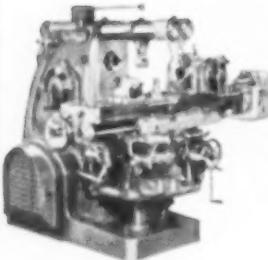
UNIFORM  
FLUTE  
SPACING

CONTROLLED  
HOOK

PRECISION  
GROUND  
CHAMFER



### A new line of knee-type milling machines



15 hp No. 3  
Model CK  
Universal style  
with 3-in. 1-speed driving head  
and live head attachment

**REPLACEMENT OF OBSOLETE MACHINE TOOLS  
IS AN INVESTMENT THAT MAKES BOTH DOLLARS AND SENSE**

You'll get the smoothest feed performance from our Kearney & Trecker knee-type milling machines. Because their CK's have a new design, heavy-duty, 2" diam. table feed screw, rotating through an extending saddle feed unit — giving you more bearing contact. That means smoother Power Feed. You get a smooth, quiet, vibration-free operation, backlash eliminated and you get 1.8 times more efficient climb milling. What's more, the infinite motor drive for table feed is synchronized with the spindle drive, making for smooth precision. No danger of cutting rollers or cast.

KEARNEY & TRECKER  
MILWAUKEE 14

# CK's

YES. Kearney & Trecker's new CK milling machines are packed with design and operating features that make them *more productive, more profitable for you.*

Spindle-mounted flywheel, broad feed and speed ranges and greater horsepower with separate motor drives for spindle, and feed and rapid traverse, mean you get fullest possible benefit from modern cutting tools.

New CK columns give you greater rigidity. Compared to former columns, they give you 1000 pounds more metal in heavier ribbing, in box-type, spongeon construction to absorb the heaviest cutting loads.

For greater production, these machines are equipped with Kearney & Trecker's famous Mono-Level Control that shortens floor-to-floor time, and materially re-

duces operator fatigue. New, non-glare micrometer dials help avoid costly errors in reading... give you a positive lock at every setting.

Automatic flood lubrication in column and knee and positive metered lubrication to table and saddle, plus generously proportioned gears and shafts assure you greater machine life.

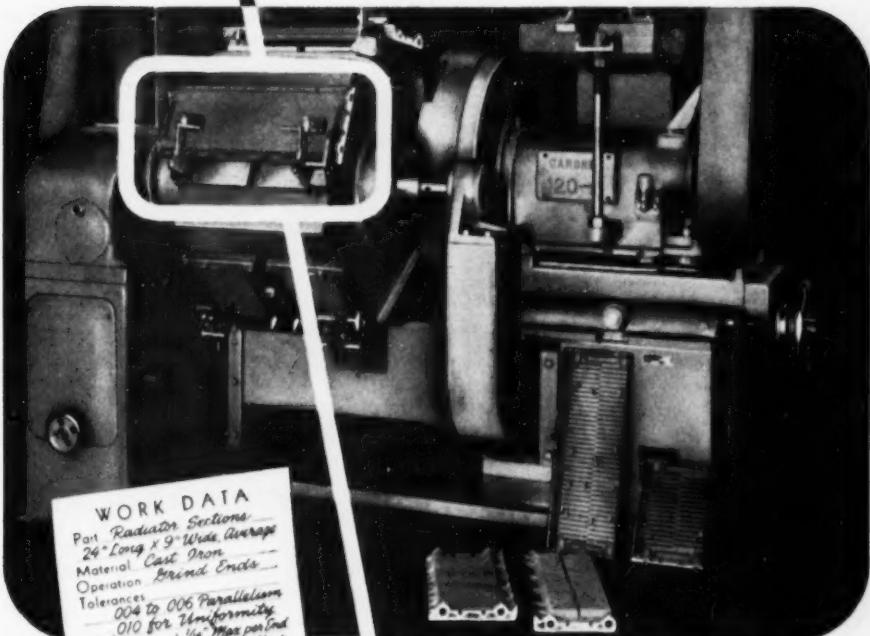
Find out for yourself about Kearney & Trecker's new CK line of knee type milling machines... how they meet every demand of modern milling practice... how they can give you greater production at greater profit.

Sizes are No. 2, 3, 4, 5, and 6... Plain and Universal styles. For complete details, contact your nearest representative or write direct. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

KEARNEY & TRECKER  
MILWAUKEE  
MACHINE TOOLS



*Double*  
**GARDNER GRINDING**



**WORK DATA**

Part Radiator Sections  
24" Long x 3" Wide Average  
Material Cast Iron  
Operation Brand Ends  
Tolerances .004 to .006 Parallelism  
.010 for Uniformity  
Stock Removal  $\frac{1}{16}$ " Max per End  
Production 180 Pieces per Hour  
Feed Hand-Load and Hand-unload  
Unclamping Performed  
Automatically  
Machine No 120A-30"  
Gardner Grinder

**big machine . . . big parts  
... big production!**

Parallel-surface grinding both ends of these radiator sections presents no problem for this big No. 120A-30" Gardner Double Grinder. Big production of big parts reduces costs, saves time, increases volume.

Gardner Double Grinders will handle almost any size part, almost any type of material. Let us help you to achieve big production . . . the GARDNER way!

Ask for our DOUBLE-GRINDING Bulletin!

**GARDNER MACHINE COMPANY**

428 EAST GARDNER STREET . . . BELOIT, WISCONSIN, U.S.A.



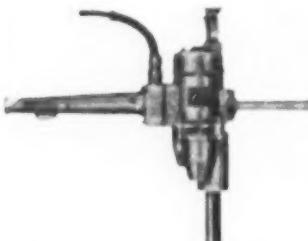
CP-806 Midget 1/4" Drill



CP-951 Heavy Duty Angle Sander



CP-930 Electric Hammer



CP-991 Heavy Duty 1 1/4" Drill



CP-800 Screwdriver



CP-816 Drill with Angle Head



CP-815 1/4" Tapper

## designed for the production line

With CP UNIVERSAL ELECTRIC TOOLS you can count on the same dependability, ruggedness and low maintenance that have built so outstanding a reputation for other CP products. Yet they are priced no higher than other production line tools because they are sold direct to the user by Chicago Pneumatic, the only major company selling electric tools directly to industry.

*Write for Catalog 899-5*



**CHICAGO PNEUMATIC  
TOOL COMPANY**

General Offices: 8 East 44th Street, New York 17, N.Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES  
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



## "BUILT-IN" FEATURE

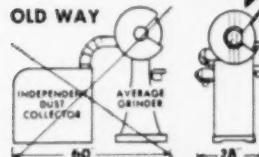
*Hammond*  
OF KALAMAZOO

### NO-DUST GRINDER

- Requires only  $6\frac{1}{2}$  square feet.
- Protects employees' health.
- Protects nearby machine tools against excessive wear from dust and grit.

A self-contained Grinder and Dust Collector for 10", 12" and 14" wheels. Write for Bulletin No. 104.

SAVE OVER 50%  
FLOOR SPACE THE  
HAMMOND WAY



*Hammond*  
Machinery Builders  
INC.

1615 DOUGLAS AVENUE

• KALAMAZOO 54, MICHIGAN

# Geneva DIAL INDICATORS

## Accuracy - Long Life - Low Cost

Here is a complete line of accurate indicators with the same precise workmanship characteristic of Geneva Lens Measures for opticians, and Geneva Depth Gages for engravers . . . their standard since 1896.

The simplicity of the Geneva movement is the secret of its accurate dial indicator readings. With a lever arm instead of a multiplicity of gears, the Geneva Dial Indicator has fewer moving parts . . . this means lower cost, and less chance for trouble and repairs.

Purchase Indicators Individually or in this

### Machinist - Tool Maker - Inspector Set



Includes Indicator,  
A.G.D. standard points,  
internal attachment,  
tool post holder,  
upright spindle,  
universal  
holding sleeve,  
universal back,  
threaded shank,  
clamp—  
in sturdy,  
metal box

Set 125U—with .001" graduated Indicator . . . \$22.50

Set 135U—with .0005" graduated Indicator . . . 24.50

Set 145U—with .0001" graduated Indicator . . . 37.50

This folder lists features and  
specifications of all Geneva  
Dial Indicators.

Free copy sent on request.

Profitable territories available to qualified dealers.



**CHICAGO DIAL INDICATOR CO.**

Dept. B, 180 N. Wacker Drive, Chicago, Ill.



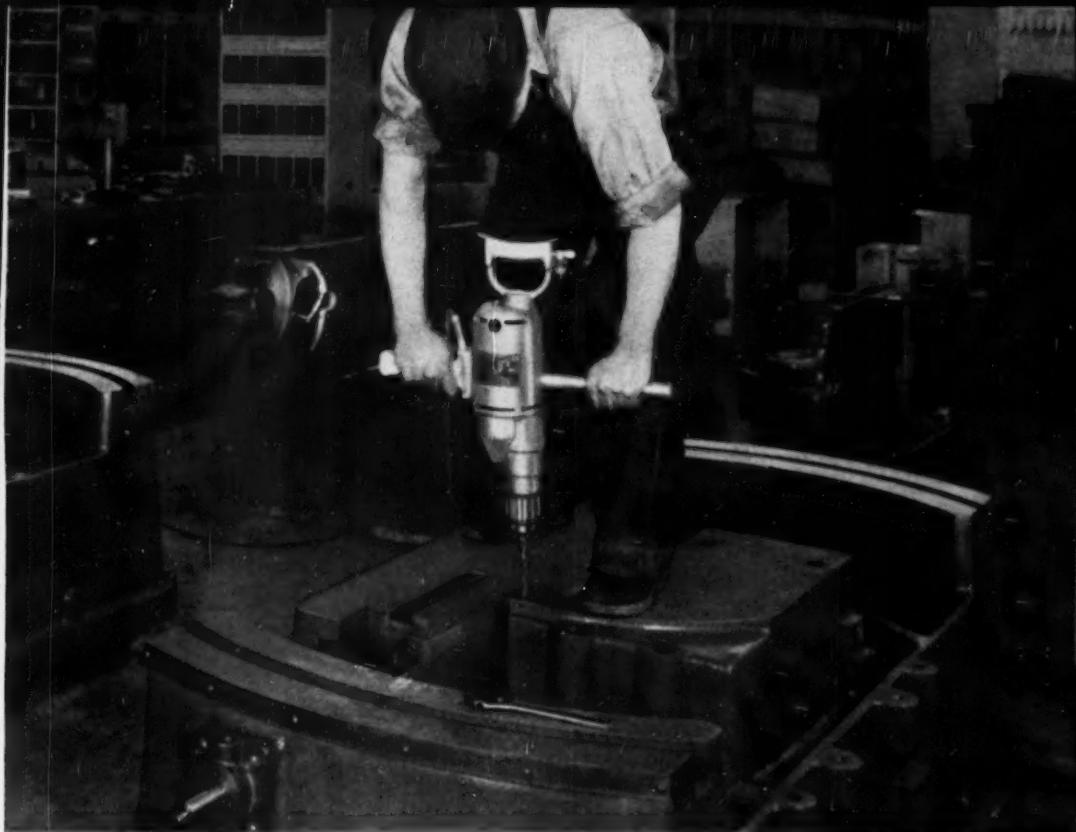
**NO. 125F**  
Graduated: .001"  
Range: .200"  
Revolutions: 2  
**\$10.00**  
with plain back  
and one point



**NO. 135F**  
Graduated: .0005"  
Range: .125"  
Revolutions: 2 1/2  
**\$12.00**  
with plain back  
and one point



**NO. 145F**  
Graduated: .0001"  
Range: .060"  
Revolutions: 6  
**\$25.00**  
with plain back  
and one point



## On factory repairs SKIL Drills shorten shut-down time

**The right drill for every job saves you trouble—and money!**



1/2 inch heavy duty drill  
ideal for heavy machinery installation and construction. Drives 1/2 inch reamers, 2 inch wood augers. Available with reversing switch for easiest withdrawal from work.

**POWER**—SKIL Drills give you more power than any other drills of comparable capacity. They stand up under heaviest loads, work faster, last longer.

**COMPACTNESS**—You work more easily in close quarters . . . get easier handling anywhere. SKIL Drills are lighter . . . designed to take less working space.

**WIDE SIZE RANGE**—26 SKIL Drill models provide the drill that fits your needs exactly. You can always choose the drill that's right for your job.

**LONG LIFE**—SKIL Drill features . . . precision-cut helical gears, die-cast aluminum alloy housings, balanced motors and finest ball bearings . . . assure years of trouble-free service.

Ask your SKIL Distributor for a demonstration

**SKIL**  
PORTABLE TOOLS

SKIL Products are made only by  
**SKILSAW, INC.**  
5033 Elston Ave., Chicago 30, Ill.  
Factory Branches in Principal Cities  
In Canada SKILTOOLS, LTD., 66 Portland St., Toronto, Ont.



TO INSURE  
PROMPT  
DELIVERIES . . .

## "STANDARD" recommends STANDARDS

You can depend on prompt deliveries of UNBRAKO Products when you use *standard sizes*.

For, despite shortages, stepped-up demand and other problems of the emergency, we've been able to keep full stocks of UNBRAKO "Standards" on our dealers' shelves—ready for immediate delivery.

And that's not all . . . Every time you use a *standard size* UNBRAKO it represents a substantial saving over the cost of a "special."

Be sure you have our latest catalog of UNBRAKO *standard* products. Send for your copy of Bulletin 643-R *today*.

Knurled Head Socket  
Cap Screws

Flat Head Socket  
Cap Screws

Self-Locking Socket  
Set Screws

SOCKET

**UNBRAKO**

SCREWS

Knurled Head  
Stripper Bolts

Precision-Ground  
Dowel Pins

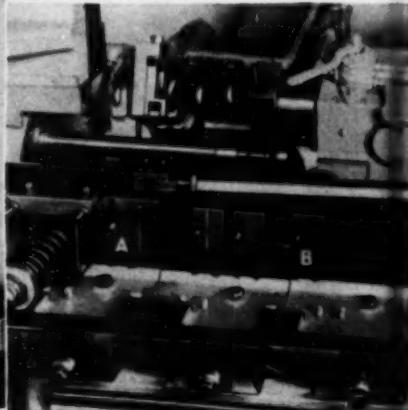
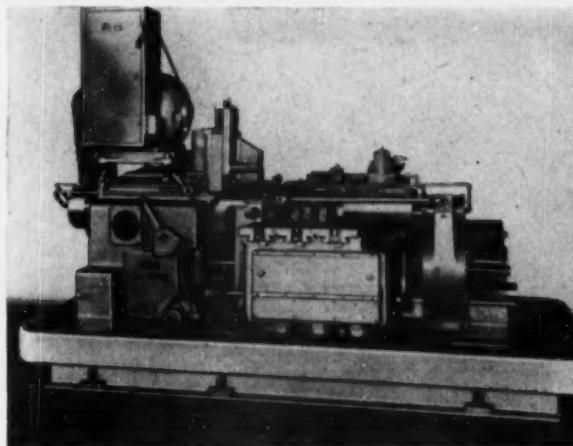
Fully-Formed  
Pressure Plugs

**-SPS** STANDARD PRESSED STEEL CO.

JENKINTOWN 22, PENNSYLVANIA

# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



## MODEL "AR" Lo-swing SLASHES COSTS ON MAIN DRIVE SHAFT

**Problem:** To offset high labor costs by increased production on Main Drive Shaft.

**Solution:** The Model "AR" Automatic Lo-swing Lathe was selected for this job because it had sufficient weight and rigidity to insure long tool life at high cutting speeds with sintered carbide tools.

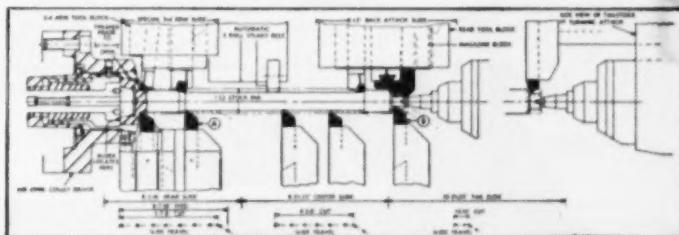
Shafts are delivered to the Lathe with the gear end finished to size and the small end centered. The line drawing shows a cross section of the collet chuck which centers and drives the shaft on the gear end. This method of driving increased the rigidity of the shaft. The three-roll steady rest is automatically operated, the rolls being advanced to contact the shaft as soon as tool "A" turns a spotting wide enough to clear the rolls. Tool "A" is the only tool cutting until the steady rest rolls support the piece, after which all the other tools start cutting simultaneously.

Another feature on this machine is the Automatic Tailstock Turn-

ing Attachment, shown in the close-up illustration, which is used to rough turn the small end of the shaft ahead of tool "B" which finish turns. This small diameter is held within close limits by this method and a green grind operation is eliminated.

The complete cycle is automatic; the operator simply loads and unloads the parts and pushes the starting button. All tools are carbide. Material is SAE 5140 steel forging and the machine cycle time is 30 seconds.

If you want lower production costs, let us help you with your turning problems.



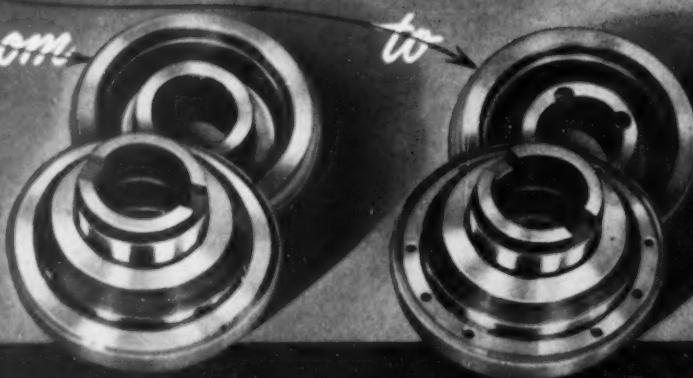
SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

**PRODUCTION COSTS ARE LOWER WITH Lo-swing**

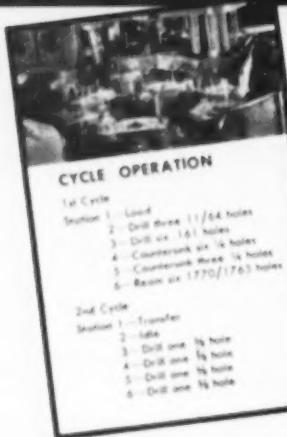
*Just 18 seconds...*

*from*

*to*



SIX STATION AUTOMATIC INDEX  
MORRIS *Mor-Speed* MACHINE  
PERFORMS 28 MACHINING STEPS IN 2 CYCLES!



CYCLE OPERATION

1st Cycle  
Station 1 — Load  
2 — Drill three  $11/64$  holes  
3 — Drill six  $1/16$  holes  
4 — Countersink six  $1/8$  holes  
5 — Counterbore three  $1/4$  holes  
6 — Ream six  $1770/176$  holes

2nd Cycle

Station 1 — Transfer  
2 — Idle  
3 — Drill one  $1/8$  hole  
4 — Drill one  $1/8$  hole  
5 — Drill one  $1/8$  hole  
6 — Drill one  $1/8$  hole

Drilling, countersinking and reaming transmission torque converter primary pump hubs for a noted automotive manufacturer, this MOR-SPEED produces 200 pieces per hour.

Multiple drilling, reaming, tapping or similar operations on mass production work usually mean multiple handling and multiplied costs. Not so with Morris MOR-SPEED Machines, designed for specific jobs... to produce more complete parts—in less time—at lower cost—to highest standards.

If you must meet rigid production and cost figures, consult Morris Engineers. They'll gladly suggest money, time and space-saving MOR-SPEED units.

THE **MORRIS**  
MACHINE TOOL COMPANY

934 HARRIET STREET CINCINNATI 3, OHIO

"A better product  
at less cost—  
with MORRIS  
ENGINEERED PRODUCTION"



# Pays for itself in 5 months



When the Rotor Application Engineer called on this manufacturer of materials handling equipment, he found the shop using universal electric grinders for grinding welds. He pointed out the possibilities for cutting costs with Rotor Air Grinders and demonstrated them with these results:

**Cuts grinding time in half** due to greater cutting power . . . higher speed under load.

**Savings pay for tools in 5 months** due to reduced man-hours for grinding. An annual return of 240% on investment.

**Improves working conditions** because Rotor air tools are lighter in weight and run cool even on hot summer days.

Would you like similar benefits? Just call the Rotor Application Engineer.

AIR O'TOOL

AIR

THE ROTOR TOOL CO.

CLEVELAND, OHIO

HIGH  
CYCLE

**The Right Tools  
in his Hand . . .**



**PUT PROFIT INTO THE OPERATION**

● If you want the best from every drillpress operator, give him the machine he can handle with minimum fatigue and lost motion — the drill that lends accuracy and skill to his hand — one of the complete line of "Buffalo" drills so widely used

in industry today. For the profitable solution to your drilling problems, simply write:



**BUFFALO FORGE COMPANY**

388 BROADWAY

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

BUFFALO, N.Y.

# Only MARVEL builds all four\*

While it is true there are several builders of hack sawing machines and many builders of band sawing machines, only MARVEL builds BOTH hack saws and band saws. The fact is that MARVEL manufactures 35 models of 10 basic types of metal sawing machines which include the world's fastest automatic production saw, the world's largest giant hydraulic hack saws, the world's most versatile band saw and the most widely used small shop saws.

With intimate and broad field experience in all types of metal cutting-off equipment and 35 different saws available, it is obvious that MARVEL Field Engineers occupy a unique and exclusive position in the industry. They are eminently qualified to make expert and unbiased recommendations covering the type, size and model of metal sawing equipment best suited to individual requirements—the most efficient, most accurate, fastest, broadest in scope and the most economical.

MARVEL is also the only manufacturer of both metal sawing machines and metal sawing blades. Because the efficiencies of both the machine and the blades are interdependent, each upon the capability of the other, expert knowledge covering both saws and saw blades is essential to the proper appraisal of any specific sawing situation. Correct balance of cutting speed and blade life, feed pressure and blade tension are all potent factors in over-all performance. Here again it is the MARVEL Field Engineer who is qualified to provide the comprehensive answer to your question. His job is to help you saw metal most efficiently—his services are available upon request—gratis.

Write for Catalog 49

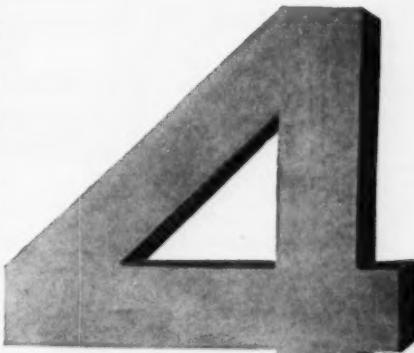
**ARMSTRONG-BLUM MFG. CO.**  
5700 Bloomingdale Ave., Chicago 39, U.S.A.

\*HACK SAWING MACHINES

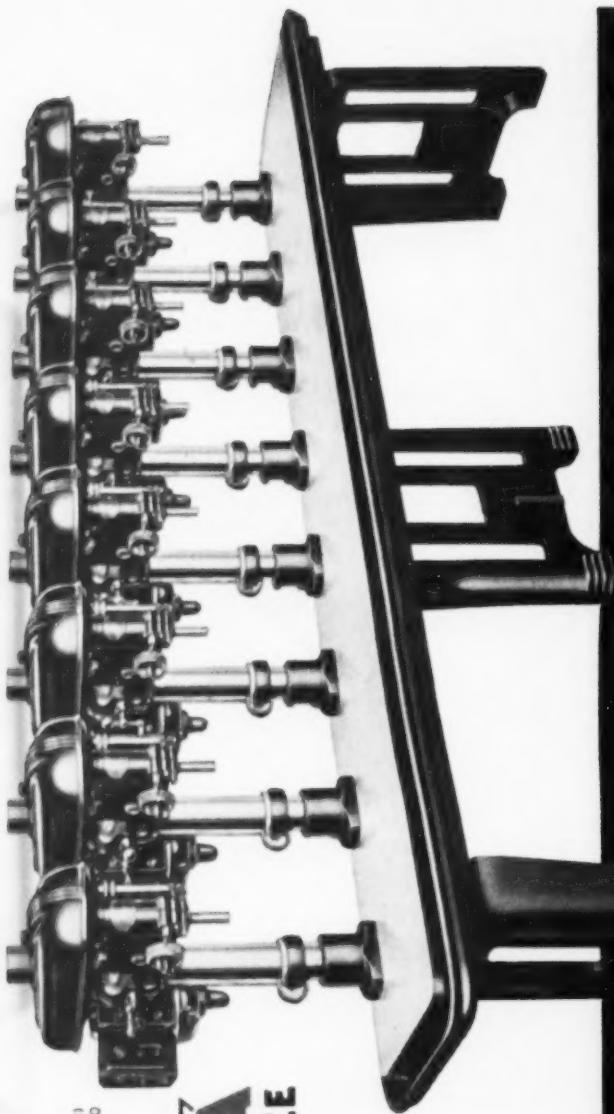
\*BAND SAWING MACHINES

\*BAND SAW BLADES

\*HACK SAW BLADES



The advertisement features a large, stylized number '4' composed of a grid pattern, likely representing catalog 49. Below the number, there is a photograph of various MARVEL sawing equipment and blades. On the left, a Hack Saw is shown with the text "No. 8A Marvel Hack Saw". In the center, a Band Saw is shown with the text "No. 8 Marvel Band Saw". To the right, a Band Saw Blade is shown with the text "MARVEL Metal-Cutting BAND SAW BLADE". At the bottom left, a Hack Saw Blade is shown with the text "MARVEL High-Speed-Edge HACK SAW BLADE". The background of the advertisement shows a workshop setting with a workbench and tools.



17" Multiple-Spindle (18)  
Drill Press \$1579.00

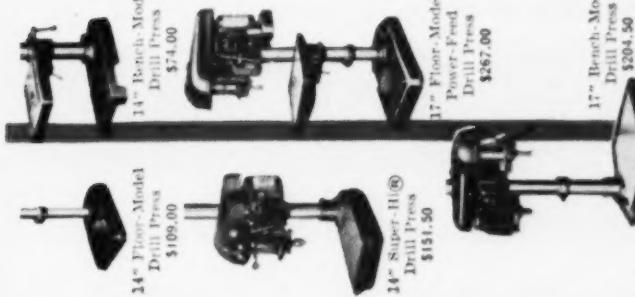
**DELTA**  
**MILWAUKEE**



17" Floor Model  
Drill Press \$1772.00

*Single-spindle drill presses  
...or batteries a block long!*

**DELTA** *The most complete line*



**TALK** about selection! There are 144 different drill presses in the big Delta line. Every one is tops when it comes to drilling — and versatile enough to do over 36 different additional jobs, besides!

Naturally you can find the exact machine your job calls for in such a complete line — with the right number of spindles, the right chuck capacity, the right speed — *and at the right cost!*

There are 14" and 17" models . . . floor and bench types . . . single spindles . . . multiple-spindle batteries . . . individual heads . . . power-feed and foot-feed machines . . . high-speed, super-sensitive models. Speeds range from 80 to 12,000 r.p.m., capacities from .023" diameter to  $\frac{3}{4}$ " in cast iron. And, as you know, Delta quality is always the best.

What's more, you get this *same wide*

selection in 42 other machines besides drill presses. Altogether, they make *Delta* the industry's most complete line of metalworking and woodworking machines. It's the only line with complete accessories to make every tool do more jobs — and often save you an investment in other machines.

That's why it pays to look to Delta first — for the right machine to do your job right. Send coupon for catalogs and bulletins on the entire Delta line.

**POWER TOOL DIVISION**  
**Rockwell** Manufacturing Company  
**MILWAUKEE 1, WISCONSIN**

**DELTA • MULTIPLEX • CRESCENT • HOME CRAFT**  
 Sold only through authorized dealers.  
 Easy time-payments!

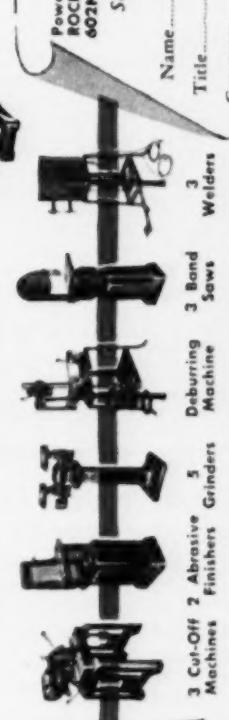


Look for the name of your Delta dealer under "Tools" in the classified section of your telephone directory.

17" Bench-Model  
Drill Press  
\$267.00

Motor and work  
bench extra.  
Prices subject  
to change  
without  
notice.

**Tear out coupon  
and mail today!**



Power Tool Division  
**ROCKWELL MANUFACTURING CO.**  
 602N E. Vienna Ave., Milwaukee 1, Wis.  
 Send me free catalogs and bulletins  
 on the complete Delta line.

Name \_\_\_\_\_  
 Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ ( ) State \_\_\_\_\_ M-47 \_\_\_\_\_

**53 Machines - 246 Varieties**

SPECIFY STANDARDS  
FOR  
*Availability*

# Carboley



## When you specify Carboley Tools you get Maximum Productivity!

The uniform high quality, consistent performance and long life of Carboley Tools assure you of:

- Maximum production per machine
- Maximum machine speeds
- Maximum adherence to tolerances
- Maximum tool life
- Maximum pieces per tool
- Minimum number of rejects

advantages that add up to maximum productivity—plant-wide.

**CARBOLOY®**  
CEMENTED CARBIDE  
**STANDARD TOOLS**

# STANDARD Tools

**available to you through  
leading industrial distributors  
in 95 cities, coast to coast!**

**T**HIMESAVING Standard Carboly Tools are as close as your telephone!

Your nearby Authorized Carboly Distributor welcomes the opportunity to give you fast, reliable service. He stocks hundreds of Standard Carboly Tools and can give you off-the-shelf delivery on most styles and sizes.

In addition to greater availability, Standard Carboly Tools bring you these outstanding advantages:

**Adaptability**—they can be quickly and economically ground in your own tool room for a variety of jobs; eliminate the need for a large, costly inventory of special tools. You can actually do up to 80% of your single-point tool machining with just eleven styles of Standard Carboly Tools!

**Universal Use**—can be used in lathes, boring mills and hundreds of single-point tool machining opera-

tions. Machine any metal or nonmetal; unmatched performance on steel cutting. Suitable for job lots or quantity production.

**Low Cost**—versatile Standard Carboly Tools are comparable in price to many high-speed steel tools and in many sizes are actually cheaper. Mass-produced under rigid quality controls to give you the highest quality at low investment cost.

And you can add the advantages of simplified ordering, easy selection and versatile grades, plus the extra assurance that in the Carboly brand of tools you get uniform quality in **every** tool . . . in **every** order . . . in **every** regrind.

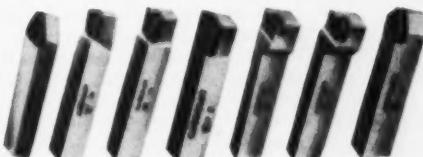
Write today for price list and new Catalog GT 250.

**CARBOLY COMPANY, INC.**

11143 E. 8 Mile Street

Detroit 32, Michigan

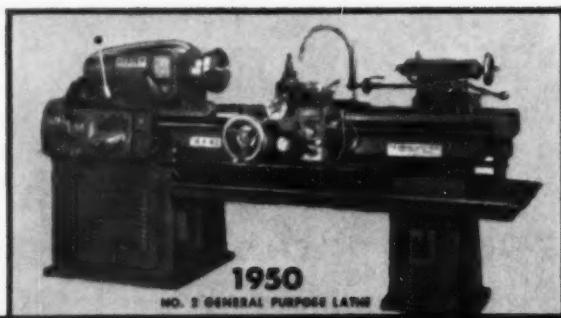
**YOU CAN GET THEM FAST . . . ADAPT THEM FAST  
FOR UP TO 80% OF YOUR GENERAL MACHINING**



You save time and money on both rush jobs and everyday production when you use Standard Carboly Tools. For example, these 11 (right-hand styles not shown) low-cost styles will do up to 80% of your general machining. Whatever the job, it pays to standardize with Standard Carboly Tools.

**"The least number of tools for  
the greatest number of jobs"**

IT PAYS TO STANDARDIZE WITH  
**STANDARD**  
**CARBOLY TOOLS**  
**13,000,000**  
**USED BY INDUSTRY**



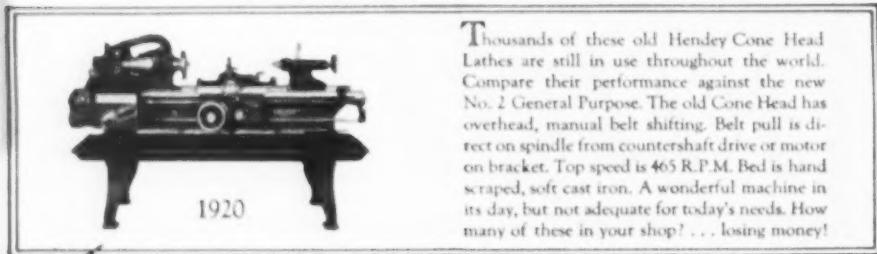
**... If you are not using Modern Hendey Machines  
you are not earning the profits that you should!**



The new Hendey No. 2 General Purpose Lathe is the ultra-modern successor of the famous Hendey Cone Head Lathe and was designed especially to perform tool room work with the greatest ease — at the greatest profit. A single lever instantly shifts the belt to any of the eight spindle speeds. There is an independent motor in the base and a unique design feature that completely eliminates belt pull on the spindle. The operator

has a choice of 48 thread and speed changes. Both the carriage and tailstock ways are induction hardened and precision ground. Other plus features include cam lock or long taper key drive spindle noses — preloaded, super-precision spindle bearings — automatic lubrication — a swing of 16" and a wide choice of bed lengths.

This is truly a modern lathe to meet modern tool room requirements. Write for catalog.



✓ Continuous, advanced engineering by Hendey is worth watching — and must be watched if you are to earn full profits from your lathes and shapers. For complete particulars and prices, contact your nearest Hendey office.

**Hendey**

MODERN

Thousands of these old Hendey Cone Head Lathes are still in use throughout the world. Compare their performance against the new No. 2 General Purpose. The old Cone Head has overhead, manual belt shifting. Belt pull is direct on spindle from countershaft drive or motor on bracket. Top speed is 465 R.P.M. Bed is hand scraped, soft cast iron. A wonderful machine in its day, but not adequate for today's needs. How many of these in your shop? . . . losing money!

THE HENDEY MACHINE COMPANY  
MAIN OFFICE & PLANT: TORRINGTON, CONN.  
BRANCH OFFICES: New York, Chicago, Boston, Detroit,  
Rochester, Los Angeles, San Francisco  
REPRESENTATIVES: Philadelphia, Cleveland, Pittsburgh

Now...make sharper cuts  
in production costs!

# New 16" Band Saw

Three-piece frame and body construction for greater rigidity, accuracy, and smoother operation. Gives you more production per operator, more profitable operations, more years of service. Patented Feeding Mechanism prevents overloading blade, greatly prolongs blade life.

Put this new Walker-Turner 16" Metal Cutting Band Saw to work in your shop. Watch how it speeds cutting and cuts production costs. See your distributor, or send for catalog describing this and other machines in the complete Walker-Turner line of power tools for metal and woodworking operations.

SOLD ONLY THROUGH  
AUTHORIZED DEALERS

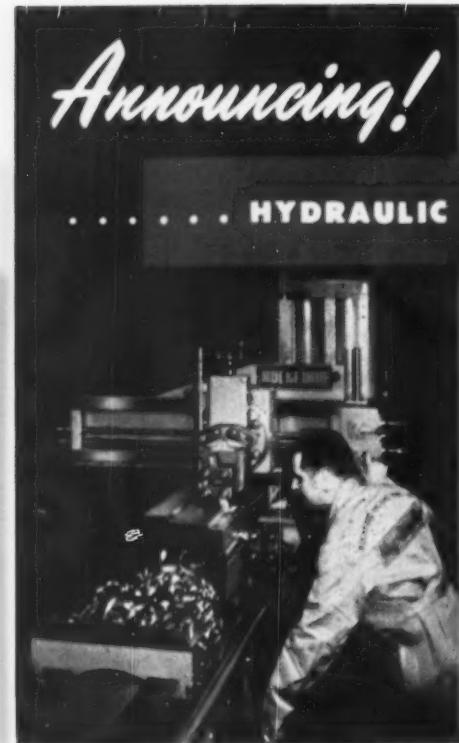
**WALKER-TURNER**

• DIVISION •

KEARNEY AND TRECKER CORPORATION  
PLAINFIELD, N. J.



DRILL PRESSES • JOINTERS • TABLE SAWS • BAND SAWS  
BELT and DISC SURFACERS • JIG SAWS • RADIAL SAWS  
LATHES • TILTING ARBOR SAWS



# Announcing!

## HYDRAULIC OPENSIDE SHAPERS IN

STROKE LENGTHS NOW AVAILABLE  
36", 48", 60" AND 72"

WORK CAPACITY UP TO  
24" HIGH — 38" WIDE

0-110 F.P.M. CUTTING SPEEDS  
0-150 F.P.M. RETURN SPEEDS  
HIGHER SPEEDS AVAILABLE

AUXILIARIES:  
SIDE HEADS VISES  
AUTOMATIC TOOL LIFTERS

HYDRAULIC DRIVE AND FEEDS  
FOR FINE FINISH AND FAST  
DEPENDABLE PRODUCTION

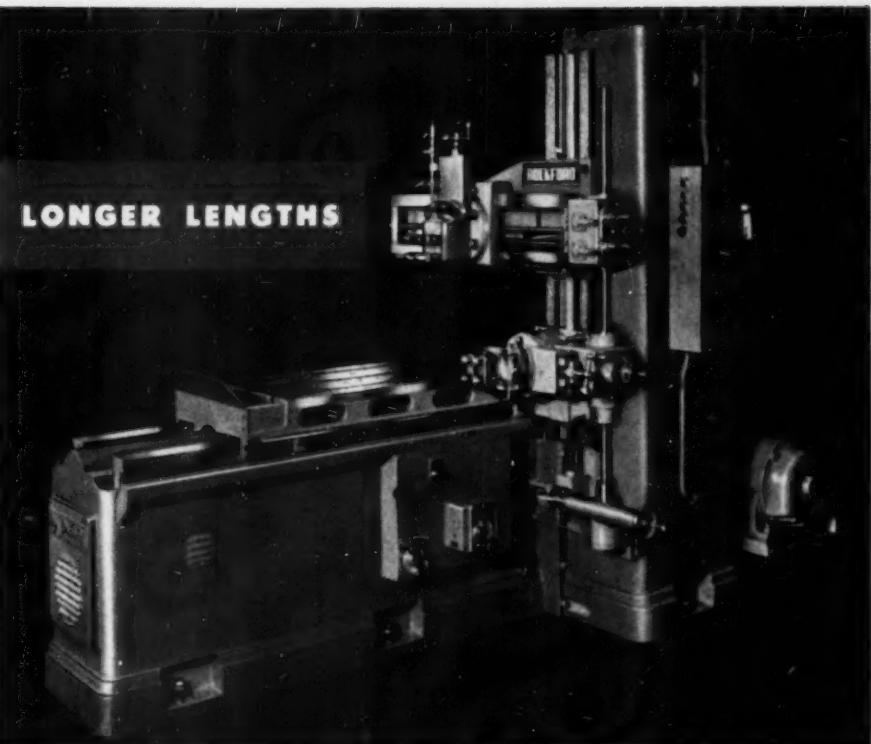
Hidden costs show themselves only on the balance sheet. A little extra output per machine — slight variations in quality — convenience in processing — these make the difference between a profitable and an uneconomical operation.

Greatest economy and efficiency result when jobs fit machines. True, many "fringe capacity" pieces are machined satisfactorily either with more machine than needed — or by stretching machines to do the job. But this increases unit costs, hampers output, set-up, handling and quality. It can frequently result in competitive disadvantage.

Check your present *small planing* and *large shaping* operations. These may seem to be satisfactory operations now. But are they economical and efficient when compared with the speed, convenience and capacity of combining this range of work on a single openside machine? Do results justify the time and set-up necessary?



ROCKFORD MACHINE TOOL CO.



Rockford Openside Shapers adapt a greater range of work in this class, to make it right for the machine. This means the most efficient use of power, feeds and speeds, stroke lengths and size capacity in relation to output and accuracy required. Openside construction allows flexibility to suit size variations. Reciprocation of the work instead of the tool provides planer accuracy, eliminates overhang and reduces wear. Stroke lengths, feed and cutting speeds are adjustable within the range of the machine.

Ask a Rockford representative to show you the advantages of machining large shaper, small planer work on a single Openside Shaper. Present methods will prove inefficient. They can profitably be displaced with Rockford Hydraulic Openside Shapers.



**Additional Data**  
and Specifications are shown in  
this Condensed Catalog. Send for  
a copy to use in comparing your  
present equipment.

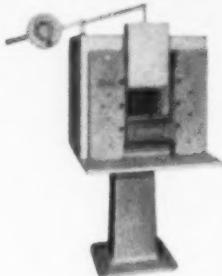
**2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS**

---

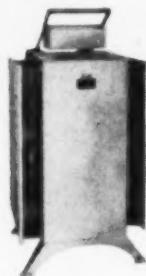
## FOR LONGER TOOL LIFE, LOWER TOOL COSTS, AND QUALITY HIGH SPEED STEEL HARDENING . . .



Sentry Model "2Y" — For hardening small tools and cutters of moly, tungsten and cobalt high speed steels.



Sentry Model "5Y" — For handling larger tools and cutters. Flexible, economical, quick to heat up.



Sentry Model "YP"—Vertical Furnace for hardening long, slender drills, reamers, broaches, etc.

## SENTRY ELECTRIC FURNACES

Sentry Electric Furnaces produce quality hardening, maximum toughness and exceptional durability in high speed steel and high carbon high chrome. Edges stand up longer which means less frequent grindings, longer tool life and lower tool costs.

Sentry Furnaces utilize Sentry Diamond Blocks permitting full soaking of tools without danger of burning. No scaling. No decarburization. Produce a clean finish which eliminates finishing operations.

Ask for catalog E20



The Sentry Company

FOXBORO, MASS., U.S.A.



# CLEEREMAN LAYOUT DRILLING MACHINE

## A Modern solution to an Old Problem—

A large portion of tools, dies, jigs, fixtures, molds, jig-less production and other jobs do not require the ultra-precision of a Jig Borer. The Cleereman Layout Drilling Machine has been designed specifically for the efficient handling of this particular work.

Built with many features of design similar to those used in Cleereman Jig Borers, the Layout Drilling Machine is an economical machine capable of accurately locating, drilling, boring, reaming, tapping, etc., with the utmost of operator ease, at a fast rate of production over a long period of time.

Cleereman standards of high quality and proven engineering design and material selection have been maintained in every detail.

WIRE OR WRITE FOR CATALOG WITH COMPLETE SPECIFICATIONS

### ADDRESS...



...Affiliated with...

**CLEEREMAN MACHINE TOOL CO. Green Bay, Wisconsin**  
BUILDERS OF PRECISION JIG BORERS AND DRILLING MACHINES

# Reduce Finishing Costs

Right  
for  
Polishing



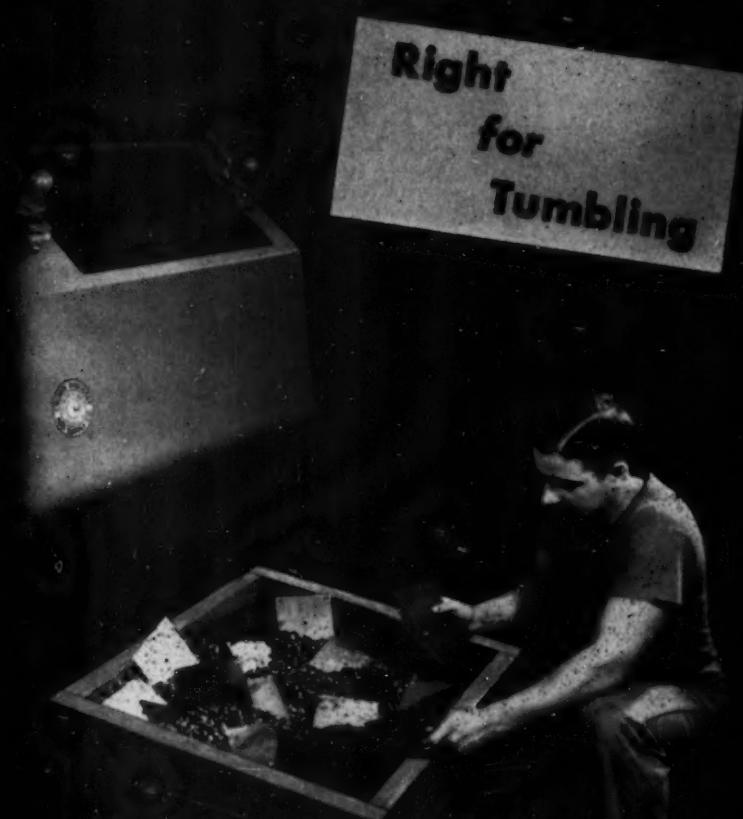
ALUNDUM Polishing Abrasive is available in a wide range of sizes and with special surface treatments to meet the exact requirements of every polishing job. For helpful polishing tips and for full details on cost-cutting ALUNDUM abrasive see your Norton distributor—or write for a free copy of "Setting-up Metal Polishing Wheels and Belts."

**NORTON COMPANY, WORCESTER 6, MASS.**

Distributors in All Principal Cities

Consult Your Classified Telephone Directory

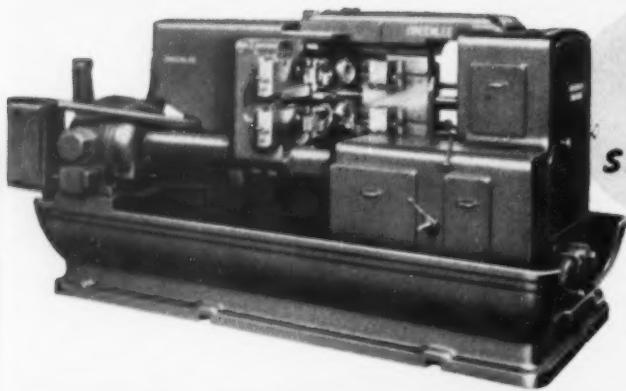
# with ALUNDUM Abrasive!



ALUNDUM Tumbling Abrasive is an ideal tumbling medium because—it's **all abrasive** for a continuous cutting action—it's **heavy** for a fast, positive cut—it's **hard and tough** for a long productive life. For further details contact your Norton distributor or write direct to our Sales Engineering Department.

**NORTON** ABRASIVES

G-211



4  
SPINDLE

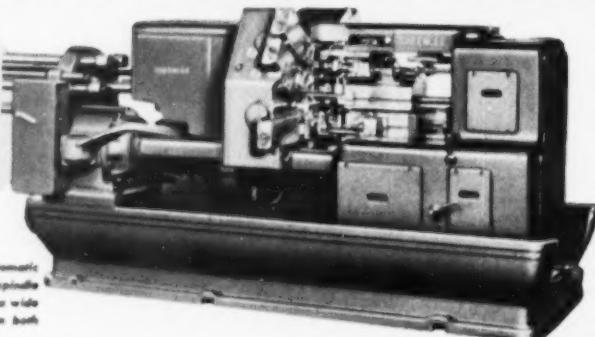
**THE GREENLEE "FOUR"**

A heavy-duty automatic made in  $1\frac{1}{2}$ " and  $2\frac{1}{2}$ " spindle capacities. The "Four" incorporates all the cost-cutting features of the well-known "Six" (see below).

# GREENLEE

## AUTOMATIC SCREW MACHINES

6  
SPINDLE



**THE GREENLEE "SIX"**

A ruggedly-built, high-speed automatic...  
...available in 1",  $1\frac{1}{2}$ ", and 2" spindle  
capacities... capable of handling a wide  
range of work... widely used on both  
short and long-run jobs.

### OUTSTANDING FEATURES OF ALL GREENLEE AUTOMATICS

Write for literature describing  
in detail all the features of  
Greenlee Automatics.



**UNIVERSAL TOOLING** — Tool holders fit  
any cross-slide cavity... are easily and  
quickly changed... reduce equipment  
costs.

**INTERCHANGEABLE CAMS** — Can be  
changed at will without re-adjustment  
of tools and holders. Cam storage is  
held to a minimum... cam costs greatly  
reduced.

**BUILT-IN THREADING DRIVE AND FEED** —  
Not an extra attachment, but standard  
equipment on Greenlee Automatics.  
**BUILT-IN COOLANT SYSTEM** — Eliminates  
cumbersome piping in tooling area...

gets coolant right where it does the  
most good.

**LARGE TOOLING AREA** — Permits using  
many timesaving, cost-cutting auxiliaries  
that often eliminate second operations.  
Various special adaptions of standard  
Greenlee Automatics can be made...  
for handling second-operation work...  
for tooling extra-long work pieces...  
for multiple feed-out arrangements, etc.  
Send us details of your work. Let our  
engineers show you how profitably  
Greenlee Automatics can be applied  
to your production.

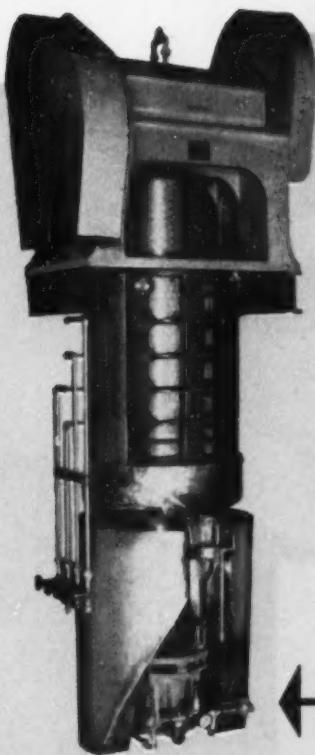
GREENLEE BROS. & CO., 1892 Mason Ave., Rockford, Ill.

MULTIPLE SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

# Norgren units help put

## Continuous in

## Jackson & Church *Continuous pulp* presses



An air-controlled FLOATING CONE beneath a vertical screw-type press spindle automatically maintains a pre-selected constant counter pressure against the force of the pulp feed, regardless of the rate of feed. No overloading; no attention.

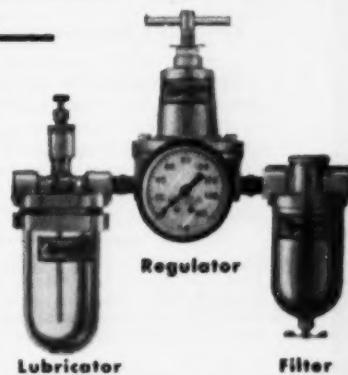
J & C selected the Relieving Type Norgren Pressure Regulator with its sensitive and accurate air regulation to give automatic and continuous control over the performance of their "Zenith" pulp press. Customers report no servicing required even after years of 24-hour service—much of it 7 days a week.

The Norgren Lubro-Control Unit also filters the air and provides automatic oil-fog lubrication of cylinder. Replaces inefficient, manual oiling; prevents scored cylinders and damaged packings.

Get all details, Norgren Blueprint No. 104.

Write C. A. Norgren Co., 235 Santa Fe Drive,  
Denver 9, Colo.

**MORAL:** For cleaner, better regulated  
air power and automatic lubrication of air  
powered equipment—CHECK WITH NORGREN



# Norgren

Filters, Regulators, Lubricators,  
Valves, Hose Assemblies.



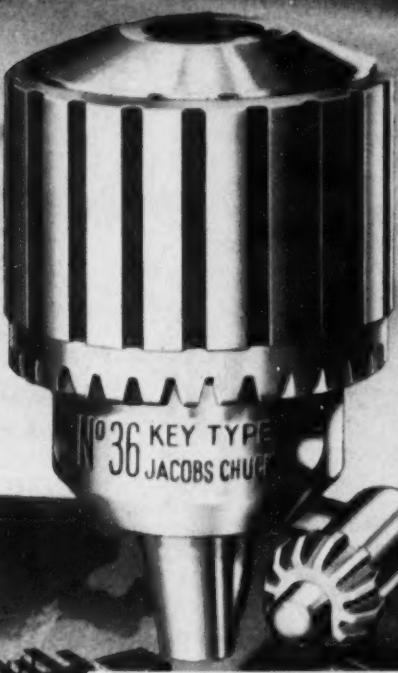
**SUPER BALL BEARING**  
**For Your Heavy Duty Drilling**

The frictionless tightening permitted by its ball bearing construction gives this rugged chuck the world's tightest grip.

When drilling tough metals under heavy duty conditions, insist on Jacobs Super Chucks to eliminate tool slippage and to reduce drill breakage.

Jacobs Ball Bearing Super Chucks and Plain Bearing Chucks are stocked by your nearby Industrial Supply Distributor. The Jacobs Manufacturing Company, West Hartford 10, Connecticut.





### PLAIN BEARING

**For Your Medium and Light Work**

The most widely used drill chuck in the world today. Its rugged design and construction assuring precision performance over a long service life come from 47 years of experience in manufacture.

That's why makers of drill presses, pneumatic and electric portable tools insist on Jacobs Plain Bearing Chucks as original equipment.



*If it's a JACOBS, it holds*  
**Jacobs Chucks**



# Dependable Cylinder Power by NOPAK



Series 1500 High Pressure Hydraulic

For simplified machine movements . . . for pulling, pushing, lifting, clamping . . . with power range from Low Pressure Air to High Pressure Hydraulic . . . there's a NOPAK Cylinder to meet your needs.

NOPAK Cylinders are available in 4 different classes of construction . . . to meet varied service requirements and to accommodate line pressures from 50 to 2000 P. S. I. . . . in 6 Standard Mountings...with or without Adjustable or Self-Regulating Cushions...and a choice of Piston Assembly Types.



Standard Heavy Duty

For further information and data on NOPAK Cylinders and Valves, refer to Sweet's File for Product Designers, or write for Bulletin SW-1.

GALLAND-HENNING  
MFG. CO.

2758 South 31st Street  
MILWAUKEE 46, Wis.

Representatives in  
Principal Cities

**NOPAK**  
**VALVES AND CYLINDERS**  
DESIGNED for AIR and HYDRAULIC SERVICE

A-5841-321-AA

It takes a  
tough, rugged

# KING

(Right) 72" KING Vertical Boring and Turning Machine at Caterpillar Tractor Co., Peoria, Illinois. Part being machined is a side shift rock for "Caterpillar" No. 12 Motor Grader.

(Below) "Caterpillar" DW-20 Diesel Tractor with W-20 Wagon. Sturdy parts for both units of this new earthmoving combination are precision machined in record time on "Caterpillar's" big KING.

to build  
*mountain-moving "Cats"!*



#### WRITE FOR NEW CATALOGS

Contain detailed description of machines and complete specifications. Catalog K-1 features machines sizes 30", 36", and 42"; K-2 sizes 52", 62", and 72"; K-3 sizes 84" and 100"; K-4 sizes 120" and 144".

Men who design and manufacture tough, big-muscled "Caterpillar" products require the same qualities of rugged power and stamina in the machine tools that build them. This 72" New-Series KING has the power, rigidity and range of speeds that make it ideally suited to "Caterpillar's" production requirements.

Here, as in other leading industries, New-Series KING Vertical Boring & Turning Machines are consistently proving their ability to cut costs and improve quality on the complete range of boring, facing, and turning work. Investigate KING's cost-cutting advantages. Ten sizes—30" to 144"—the widest size range in the field.

American Steel Foundries

**KING MACHINE TOOL DIVISION**

CINCINNATI 29, OHIO

Builders of King Vertical Boring & Turning Machines and Sebastian Lathes

# **NOW - Pressure Control**



Up to 15-inch Ram Stroke  
**BIG — but COMPACT**  
1 to 50-Ton Work Pressure  
Dual Safety Controls  
Manual or Automatic  
24-inch Daylight  
31" x 19 $\frac{1}{2}$ " Work Table  
Independently Adjustable  
Pressing and Traverse Speed

# for those BIGGER Jobs!

## 50-TON MULTIPRESS

**Extra adjustability, accuracy and efficiency of oil-hydraulic MULTIPRESS now ready for hundreds of higher-tonnage needs**

Six thousand Multipresses in the one- to 35-ton range have already proved the advantages of their fast, smooth, controlled pressures and wide-range, fully adjustable ram action, on hundreds of different production operations.

*Now these same Multipress advantages can be applied to operations in the 50-ton range!*

And every production-boosting feature of the smaller models is retained in the 50-ton model.

**Widely Adjustable Ram Action** The 50-ton Multipress offers a fully adjustable ram stroke up to 15 inches. Pressing and approach speeds are independently regulative, permitting rapid traverse in combination with controlled working speeds for greatest production.

The press ram can be set to return upon reaching either distance or pressure limits, preset according to the work being handled.

Time delay control and many other types of operating sequences are also available.

**Big Work Area** With a 24-inch daylight opening and a work table 31 inches wide by 19½ inches deep, the 50-ton Multipress provides plenty of room for large work, fixtures, and special tooling. Operating controls are at the operator's fingertips—safety engineered for your protection.

**8 MULTIPRESS Frame Sizes!  
1-Ton to 50-Ton Capacities!**



**Manual or Automatic Control** The press can be equipped for either manual or automatic ram control, with dual hand levers or dual push-buttons for safety, if desired. Nine control valves offer many different ram actions—from simple manual cycling to synchronized sequence operation. Vibratory repeat stroke operation, an exclusive Multipress feature, is also available.

**Indexing Tables and Accessories** Six- and twelve-station Multipress indexing tables, widely used for automatic feeding of parts to the press ram, are available for the 50-ton Multipress, in addition to a variety of other standard accessories for special types of operations. The press is also ideal for hydraulic interlocking of automatic feeding, loading, and ejection devices for almost any standard need.

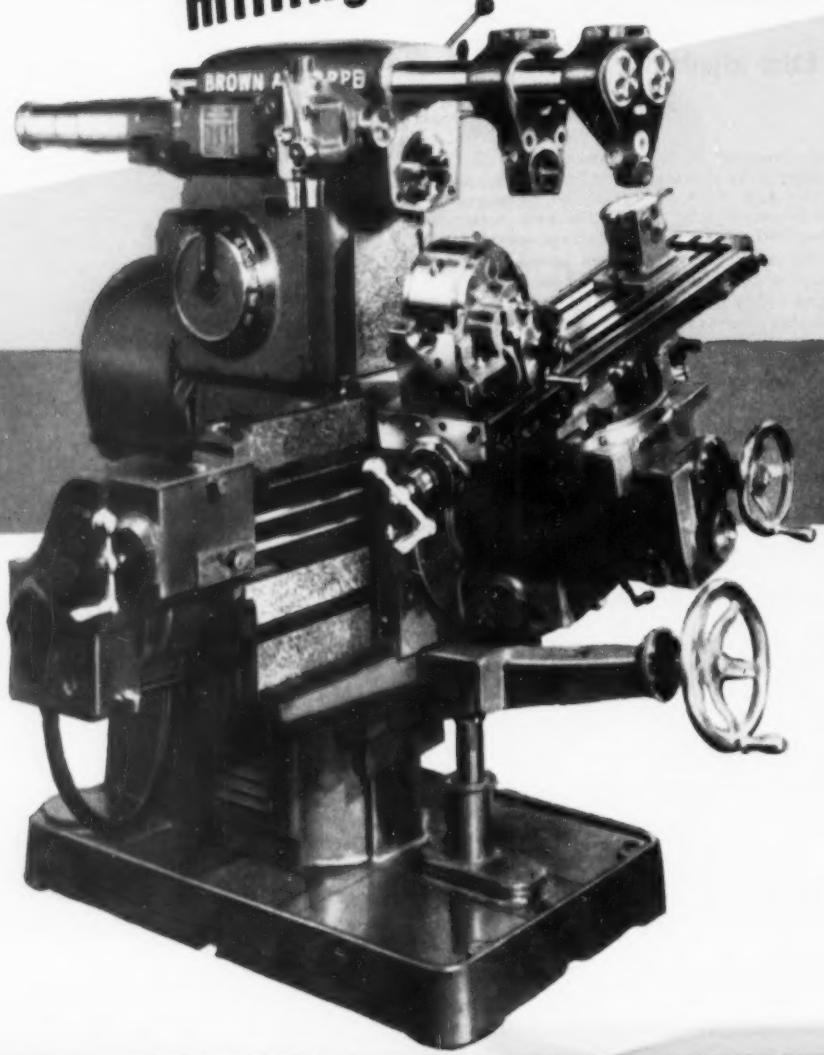
**Compact, Versatile, Efficient** Panel-mounting of control valves and cylinder is a Multipress feature of major importance. It permits more compact design, increases efficiency, and reduces maintenance costs. Requiring minimum space, the press is easy to adapt to any production line, even in close quarters.

Write today for details on this new answer to faster, better, safer, lower-cost production!

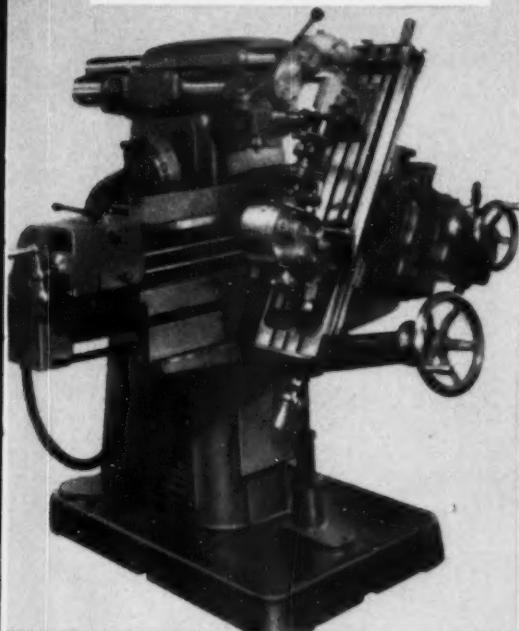
**The DENISON Engineering Co.**  
1153 Dublin Rd., Columbus 16, Ohio

 **DENISON**  
**Hydrolitics**

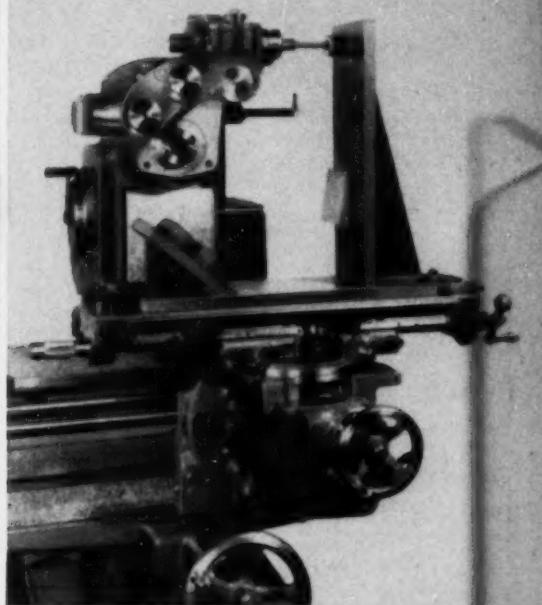
**ANNOUNCING**  
The New OMNIVERSAL  
milling machine



Swiveling knee permits rigid support of bevel gear on original centers throughout cutting operation . . . eliminates truing, maintains concentricity.



Omniversal milling head does face milling and boring in three planes on this large piece without resetting.



**Brown & Sharpe** 

## **...the milling machine with unparalleled versatility!**

This is it! — the ultimate in milling machine versatility for toolrooms, experimental and research laboratories — also repair shops and small-quantity production plants. The new Brown & Sharpe No. O Omniversal Milling Machine performs a wide variety of work without the need for attachments, jigs, or fixtures.

Milling compound angles, boring multiple holes from different directions, cutting teeth in tapered cutters — these and many other operations can all be done without resetting the work on the table.

Get the complete story on this outstanding machine. Brown & Sharpe Mfg. Co., Providence 1, R. I., U.S.A.





**AVERAGE PRICE of \$3<sup>20</sup>  
THREADING TOOL**

**plus SPEEDY CHANGEOVER!**

That's why so many shops are going "all out" for the Cri-Dan Single Point, High Speed, Semi-Automatic Threading Machine.

The Cri-Dan definitely fills a long felt need in many shops for a speedier, more economical and more versatile threading machine . . . users who have taken advantage of its remarkable economies and versatility are outspoken in their enthusiasm . . . they've proved that the Cri-Dan outmodes their former methods of generating threads . . . and this includes 'em all . . . external, internal, right or left-hand, tapered, triangular, square, multi-start, buttress, trapezoidal, round or special threads.

Why not  
contact your  
**LEES-BRADNER**  
representative



*The* **LEES-BRADNER** Company

CLEVELAND 11, OHIO U.S.A.



(Photo Courtesy Mississippi Valley Structural Steel Co.)

This progressive fabricator now has six Stone metal cut-off machines in operation.

The Stone Swing-Cut in your shop will cut metals at the rate of 4 seconds per square inch at a cost of approximately 1 1/2 cents per square inch. You can lower your metal-cutting costs—in ferrous or non-ferrous materials—with a Stone Swing-Cut. Write today for further information.

## LOW-COST METAL CUTTING



**STONE MACHINERY CO., INC.**  
300 FAYETTE ST. MANLIUS, NEW YORK

# Hardened Tool Steel Vees

60 ROCKWELL C

protect the carriage ways of

"AMERICAN" PACEMAKER LATHES

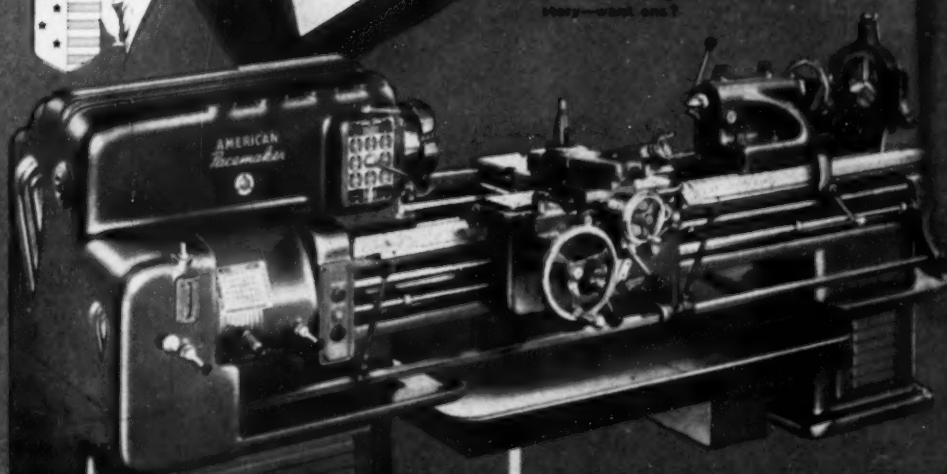
They are standard equipment  
on all "AMERICAN" Lathes

These hardened vees are made of cold  
tool steel and ground to precise tolerance.  
Very interchangeableability should replacement  
ever be required.

After hardening, the metallurgical  
structure is stabilized by  
cold treatment at minus 100°  
Fahrenheit to prevent twisting  
or warping.

This feature is but one of the  
outstanding advantages offered  
by the new "AMERICAN" Pacemakers  
Lathes.

Bulletin No. 10 gives the complete  
story—write, now?



THE AMERICAN TOOL WORKS CO.

Cincinnati, Ohio U.S.A.

LATHES AND RADIAL DRILLS

**ECLIPSE ENGINEERING ASSURES -**

**THE RIGHT DRIVE  
FOR YOUR  
END CUTTING JOB**

First, it's engineered right. Second, it's made right! No matter what your production problem, Eclipse is well equipped to design and manufacture the tool required. Eclipse's radial, pin, quick-detachable taper, square taper and balanced inverted drives are famous for performance. The right Eclipse drive will be recommended to you . . . and we build equally well other special drives to customer specification. Call or write us about your problem today. Eclipse representatives are available in every major industrial area.



Radial Drive



Pin Drive



Quick-Detachable  
Taper Drive



Square Taper  
Drive



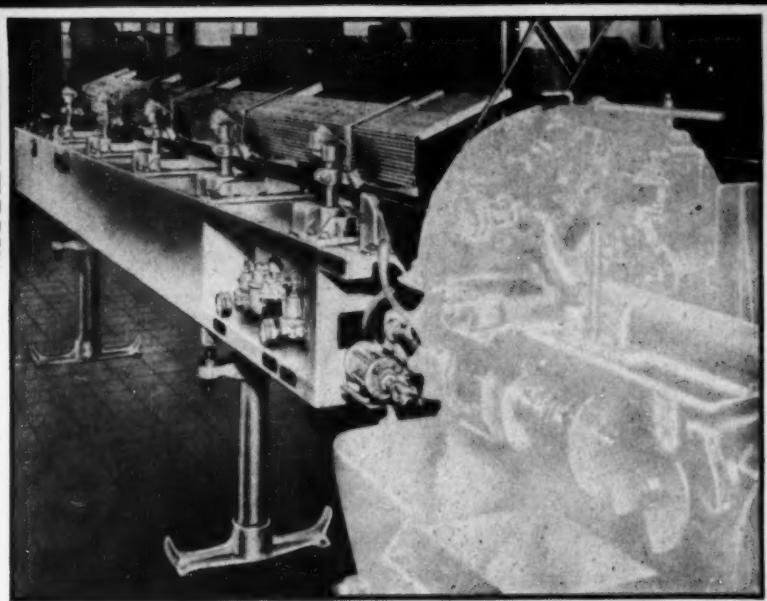
Balanced  
Inverted  
Drive

High Speed Steel and Carbide Tipped

**ECLIPSE COUNTERBORE CO.**  
*Founded thirty five years ago*

DETROIT 20, MICHIGAN

# Increase Screw Machine Output Up to 60% or More!



**LIPE Fully Automatic MAGAZINE LOADING PNEUMATIC BAR FEEDS**

Actuated by the pneumatic control system of valves and cylinders. First, lower half of feed tube is moved backward to receive bottom piece of bar stock held in magazine. Second, lower half of feed tube, with bar stock, is returned and stock pusher begins function.

**MAGAZINE HOLDS NORMAL 8-HOUR DAY RUN OF STOCK . . .** can be loaded with stock bars ranging from nineteen  $\frac{5}{8}$ " bars to ninety-six  $\frac{1}{8}$ " bars. By actual time study, time required to load magazine from nearby stockpile ranges from 80 to 114 seconds—average 100 seconds. Just a matter of minutes to change from one size stock to another.

Ask for our engineers to study your problems and work with your production men in their solution.

**MODEL AML BAR FEEDS FOR B & S SCREW MACHINES HANDLE FULL CAPACITY OF ANY MACHINES TO WHICH BAR FEED IS ATTACHED.**

(Model Determined by Spindle Bore of  
Machine)

Model  
AML 56 for B & S No. 00 Spindle Bore  $\frac{3}{16}$ "  
AML 68 for B & S No. 00 Spindle Bore  $\frac{1}{4}$ "  
AML 87 for B & S No. 0 Spindle Bore  $\frac{5}{16}$ "  
AML 100 for B & S No. 0 Spindle Bore 1"

Restocking time replacing bar in spindle.....	4 sec.
Time to load magazine per bar.....	$\frac{1}{2}$ to 1 sec. (2 to 3 mins. for full magazine)
Piece length per one feed-out or collet opening.....	0" to 16"
Stock capacity (dia.) #0 B & S.....	$\frac{1}{8}$ to $\frac{1}{2}$ " dia. (approximately)
Magazine capacity.....	19 - $\frac{5}{8}$ " bars 96 - $\frac{1}{8}$ " bars
Time per one feed-out or collet opening.....	.2 to .5 sec.
Feed cylinder air pressure.....	18# to 35# P.S.I.
Installation time.....	6 hrs. to 8 hrs.
Set-up time, bar feed unit only.....	5 min. to 15 min.
Number of machines per operator.....	Up to 8 or 10



**Lipe - ROLLWAY CORPORATION**

Syracuse 1, N.Y.

# PRODUCTION ..the Call of the Hour!

GET IT WITH

MOTCH & MERRYWEATHER

Automatic

Circular Sawing  
Machines!

No. G.M. A.M.  
Automatic  
Circular Sawing  
Machine

Material ... SAE 1020  
Size ... 4" dia.  
Sawing Time ... 50 seconds

Material ... SAE 1020  
Size ... 3" 1-Beam  
Sawing Time ... 22 seconds

Material ... SAE 1020  
Size ... 1-1/4" x 3"  
Sawing Time ... 20 seconds

Material ... SAE 1020  
Size 3" O.D. x 1/8" wall  
Sawing Time ... 28 seconds

For cutting off ferrous or non-ferrous stock up to  
24" length and 4" diameter, round or square.

SPEED • ACCURACY • SQUARE ENDS • LOW COST

Higher production lowers your cost per cut-off piece, together with extreme accuracy which eliminates many second operations. This little giant of production will save you money in tool costs and get your work out faster.

Investigate! Ask for Bulletin No. 150-D.

\* \* \*

Look to Motch and Merryweather for production cut-off machines handling stock from  $\frac{1}{4}$ " through 18" diameter, as well as machines for special applications, including sawing with simultaneous second operations. M. & M. builds circular sawing machines, automatic saw sharpeners and circular saw blades, transfer and special machines.

Manufactured by

**THE MOTCH & MERRYWEATHER MACHINERY COMPANY**  
715 PENTON BUILDING • CLEVELAND 13, OHIO  
Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

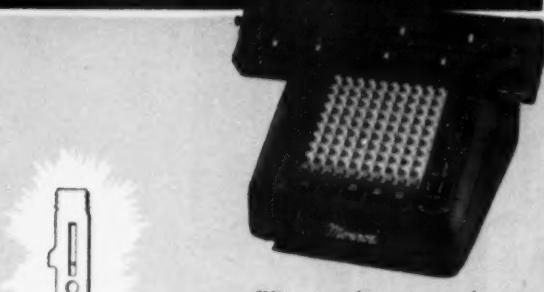
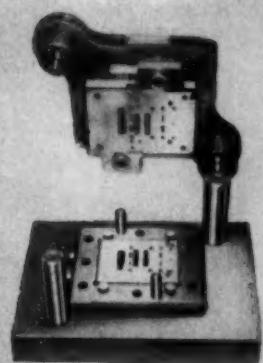
PRODUCTION WITH ACCURACY MACHINES AND EQUIPMENT



# PRODUCTO

## DIE SETS

HELP Monroe TO  
add ACCURACY  
subtract REJECTS  
divide TOLERANCES  
multiply PRODUCTION



New streamlined Monroe Calculating Machine No. CAA and (left) actual size numeral key stem.

When you have a very fussy part to produce . . . such as this numeral key stem for the Monroe Calculating Machine . . . the Die Set must be of the highest quality.

The job calls for a six station progressive piercing, shaving and blanking die, with the majority of tolerances held to  $\pm .001$ . Normally produced on an automatic press at the rate of 150 to 175 parts per minute . . . as high as 70,000 parts per grind . . . an excellent performance considering the shaving operation involved. Material is .050 half hard CRS.

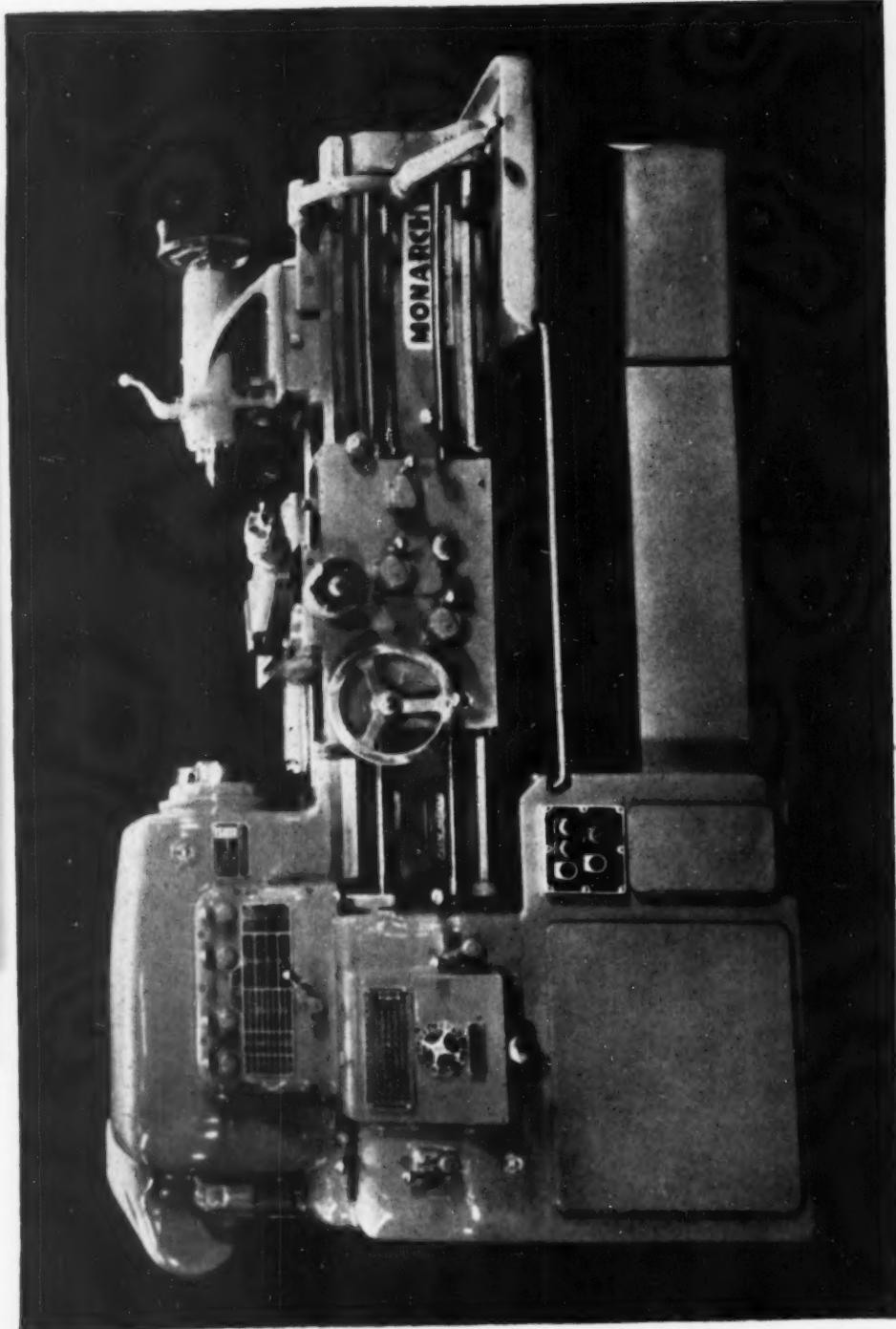
With precise alignment of guide pins and bushings, and closely held parallelism of punch and die holder, extreme accuracy can be maintained. Producto Die Sets have these qualities. *Make sure* with Producto . . . for fewer rejects, longer die life, greater accuracy.

Call "Producto" in classified telephone directory in major stamping centers. Fast service thru 26 Producto representatives.

NEW PRODUCTO ASSEMBLY WAREHOUSE: The Producto Machine Co.,  
3632 Delphos Ave., Dayton, Ohio.

**THE PRODUCTO MACHINE COMPANY**

910 Housatonic Avenue, Bridgeport 1, Conn., Tel. 4-9481



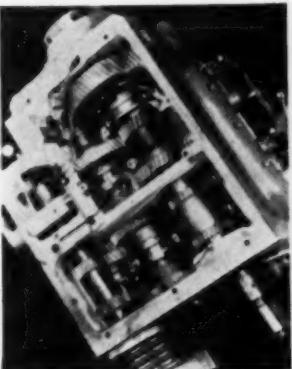
# PRECISION POWER WHERE IT COUNTS

## —at its best on Series 60 Lathes

You'll get peak power—and long life at original accuracy in the—**headstock of every Series 60 Lathe.** Its extremely efficient design is characterized by two outstanding features, both pioneered by Monarch. First, is the use of helical gears—all made of hardened alloy steel, and with ground or shaved tooth contours. The result is quieter, more efficient operation, with less waste power, less wear (and, as a result less down time). Equally important is the extra-wide design of the Series 60 headstock gears. Not only is there more tooth contact at all times, providing more efficient transmission of power—but shifting is easier and faster (with less gear wear) by means of clutches instead of shifting the gears themselves.

An almost integral part of Monarch's superior headstock design is the American Standard Camlock Spindle Nose—a distinct advantage because of easier, faster, more rigid, more accurate mounting of chucks and fixtures.

These and many other design and construction features mean more savings with Monarch's Series 60 Machines, available in 14", 16" and 20" sizes. For complete information ask for Booklet 1113.



Monarch Series 60 Headstock Gearbox

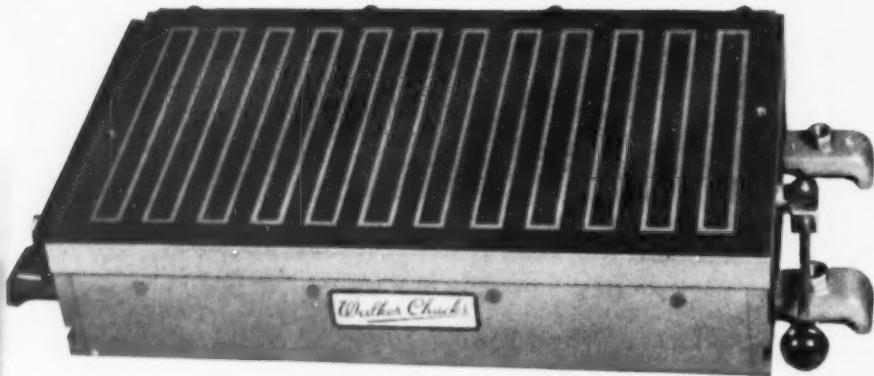
### You'll Save on Maintenance and Operating Expense With These Series 60 Features:

1. Totally-enclosed gearbox and end gearing—preserves accuracy.
2. Automatic pressure lubrication—insures long life at original efficiency.
3. All anti-friction bearings—for peak power and less maintenance.
4. Hardened, ground or shaved, wide helical gears in headstock—for precision power, easier shifting.
5. American Standard Camlock Spindle Nose—for quick, rigid chuck and fixture mounting.
6. Flame-Hardened and Ground Bedways—preserves accuracy—proved on over 25,000 Monarch Lathes.
7. Induction hardening of many critical parts—for long, trouble-free life.



**THE MONARCH MACHINE TOOL CO. • SIDNEY, OHIO**

*Monarch*  
TURNING MACHINES



Twenty-three sizes of WALKER Magnetic Chucks—giving you a wider scope of production on either light hand-operated or power-fed machines.

*Walker Chucks*

save operational time, eliminate need for costly and time-consuming clamps and work-holding fixtures.

*Walker Chucks*

now in the following types and sizes:

PERMANENT TYPE		SWIVEL TYPE		ROTARY TYPE	
4 $\frac{5}{8}$ " x 7"	6" x 12"	10" x 15"	4" x 8"	4" 12"	
4" x 8"	6" x 18"	10" x 24"	6" x 18"	6" 14"	
5" x 10"	8" x 18"	12" x 24"	8" x 24"	9" 16"	
6" x 11"	8" x 24"	12" x 36"		10"	
	8" x 36"				

Immediate Delivery from Stock

*Hold Everything with Walker Chucks*

**O. S. WALKER CO. INC.**

WORCESTER 6, MASSACHUSETTS

*Original Designers and Builders of Magnetic Chucks*



**FRACTIONAL GRADES** enable you to choose the exact degree of hardness desired by splitting every normal grade into three degrees of hardness, where a whole grade change would be too great.

. . . and all manufactured in FRACTIONAL GRADES. This outstanding and exclusive Bay State development eliminates using segments that are "close enough" for hardness grade. FRACTIONAL GRADES permit a precise selection of grade for the work intended.

**ADVANTAGES:** Increased Production . . . Faster Stock Removal . . . Sharper, Cooler Cutting . . . Better Finish . . . Closer Tolerance . . . Lower Power Consumption.

BAY STATE'S other abrasive products for surfacing jobs are also available in FRACTIONAL GRADES.



( 0 ) ( 0 ) ( 0 ) ( 0 ) ( 0 ) ( 0 )

*Send for descriptive literature.*

**BAY STATE ABRASIVE PRODUCTS CO.**  
WESTBORO, MASSACHUSETTS  
Chicago, Cleveland, Detroit, Pittsburgh.

# extra space



*is standard equipment  
at no extra cost with  
tray-top cintilathes*

Tray-Top engine lathe operators get more work done by having tools, mikes, accessories, instantly within reach, right on top of the headstock and tailstock that gave this light duty lathe its name. No temptation to clutter the bed ways, convenience and safety assured . . . moreover, the spacious cabinet legs really have space for the operator to keep accessories safely out from under foot. Bench space requirements are cut or eliminated.

Tray-Top combines these and other valuable features—enclosed quick change box, "color-match" speed selector, twelve speeds, drop levers, start-stop apron control, long taper key drive spindle nose, built-in leveling jacks, external voltage controls. Make Tray-Top your next buy—it's your best buy.



OF OUTSTANDING VALUE

## cincinnati lathe & tool co.

CINCINNATI 9,  
OHIO, U. S. A.

*A NEW time & money saver.*

## The NEW Blanchard Wheel Holder Eliminates Sulphuring

Now you can eliminate sulphuring when mounting cylinder and sectored wheels on Nos. 11 and 18 Blanchard Grinders. The new Blanchard Wheel Holder makes wheel mounting a matter of minutes, thereby increasing productive grinding time. Specially designed taper spring clamps, actuated with a wrench, hold wheels solidly and safely in the new ring-type holder. Now there is no reason for not using the right wheel for every job — to get maximum results from your Blanchard every time. Write for new Bulletin giving complete details.

*for mounting BLANCHARD wheels*

Whether you use the new Blanchard Wheel Holder or sulphur, you can't go wrong if you use Blanchard Grinding wheels. 25 years of research, design and manufacturing experience stand back of every Blanchard cylinder, sectored and segment wheel. When you consider production and overall economy — "there is no better wheel for a Blanchard Grinder than a Blanchard Wheel." Write for Blanchard Wheel Catalog.



ON NO. 11  
BLANCHARD



ON NO. 18  
BLANCHARD



CYLINDER

SECTORED



NO. 18 BLANCHARD  
SURFACE GRINDER

PUT IT ON THE BLANCHARD THE BLANCHARD MACHINE COMPANY  
64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

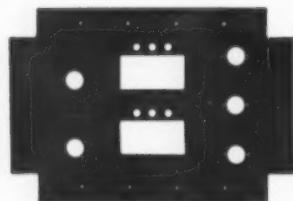
**STOP!** the high cost of  
piercing sheet metal in quantities  
of 1-5-10-50-100 or 200 pieces  
of a kind.

## COMPARE!

the Wiedemann R-41P with your  
best times on jobs similar to those  
below on sheets up to 26" x 48".

**TIMES!** shown include  
set-up.

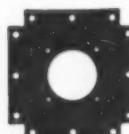
INVESTIGATE the WIEDEMANN METHOD



First piece 45 minutes  
Additional pieces  
2.75 minutes each  
Includes all set up



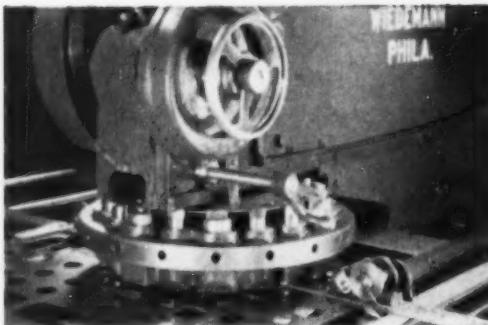
First piece 37.5 minutes  
Additional pieces  
90 minutes each  
Includes all set up



First piece 240 minutes  
Additional pieces  
105 minutes each  
Includes all set up

### Do You Produce Templates?

The Wiedemann R-41 Micro-Turret Punch Press produces templates with holes accurate to  $\pm .002"$  at unparalleled high speed. Write for details.



R-41P Wiedemann Turret Punch Press

## Here's how you can pierce short run work at such great savings

### SAVE on Tool Set-up

- ★ 18 punches and dies set-up for instant use
- ★ Install tools in turrets in less than one minute
- ★ Tool cost is always low

### SAVE with UNMATCHED FLEXIBILITY and SPEED in ACCURATELY LOCATING HOLES

- ★ Gauges are set-up from drawing dimensions, charts, or templates
- ★ Gauges locate from one corner of the material
- ★ Center punched layout or pilot holes
- ★ Back gauge bar is handwheel operated
- ★ Cross stops are positive
- ★ Both motions are provided with direct reading scales or dials

### THE R-41P TURRET PRESS PIERCES . . .

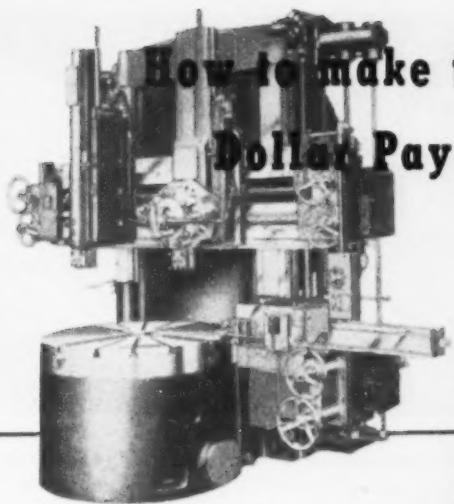
- ★ Round holes to 3 $\frac{1}{8}$ " dia., square holes to 2 $\frac{1}{4}$ " x 2 $\frac{1}{4}$ ", round end slots to 3 $\frac{1}{8}$ " long.
- ★ Odd shaped and grouped holes
- ★ Knockouts, dimpling, corner and edge notches, radius corners, small louvers
- ★ Special corner development cutouts
- ★ Large rectangular, square, or L shaped openings

### THE WIEDEMANN METHOD IS THE ONLY LOGICAL SOLUTION TO THE SHORT RUN PIERCING PROBLEM

Send Drawings for Time Study

**WIEDEMANN MACHINE COMPANY**

4219 Wissahickon Avenue • Philadelphia 32, Pennsylvania



## How to make the Invested Dollar Pay More . . . .

Increased Shop Efficiency through Replacement of Economically tired machines.

Initiative in applying machines to the job.

Development of short cuts and tooling arranged to improve time savings since increased machine efficiency as well as shop efficiency pay more on the Invested Dollar.

Investment in machines of complete flexibility having the potential facilities to adapt themselves to present and future changes of tooling and machining methods.

Bullard Cut Master meets these conditions and one customer states: "You can do more with a Bullard than you can with—."

In this same customer's plant, a Bullard installation is showing a nice 40% savings over the previous method.

This is only one of many instances where Cut Master lives up to its name.

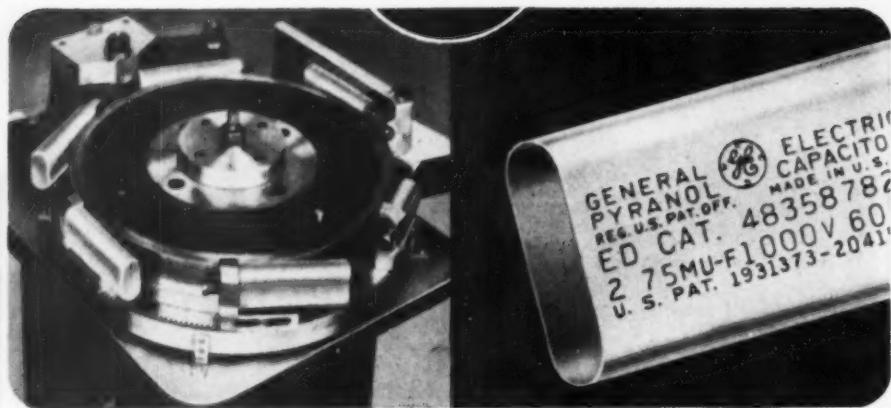
These machines provide maximum shop efficiency and answer the question, "How to make the Invested Dollar Pay More?"

*On request we will be pleased to furnish you with a copy of Mapi Replacement Manual.*



If you have hidden costs which are paying for a Cut Master, why not investigate and then have a Cut Master in 30", 36", 42", 54", 64", or 74" size.

THE  
**BULLARD**  
COMPANY  
BRIDGEPORT 2,  
CONNECTICUT



• Noblewest Model 286 marking G.E. capacitors with large inscriptions shown at right.

**NOBLEWEST  
PRODUCTION  
MARKING  
MACHINES**

*Save Time  
Cut Costs*

*Here's How:* The marking operation is fast. There are no delays in the production schedule. Marking speeds are practically unlimited. Numbers and lettering are sharp, clearly readable, because the inscription is permanently rolled in—identifying the product for life.

Whatever your problem, Noblewest will gladly help you save time and money in marking metal, plastics, and other materials. Catalog on request.

Write Noble & Westbrook Mfg. Co., 25 Westbrook St., East Hartford 8, Conn.

MARK IT BEST WITH

**NOBLEWEST**

NOBLEWEST  
IMPORTED  
MANUFACTURED

*Roll-O-Matic*

MARKING

EQUIPMENT FOR MARKING • GRADUATING • EMBOSsing • NUMBERING

**"no more GAMBLING on tool steel selection"**

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of picking the right tool steel right from the start is going over big.

*"Handiest selector I've ever seen!"*

**"No more gambling on tool steel selection"**

"You're right, the application should dictate the choice of the tool steel" . . . and many, many more favorable comments.

You'll want your CRUCIBLE TOOL STEEL SELECTOR. It uses the only logical method of tool steel selection—begin with the application to pick the right steel! And the answer you get with one turn of the Selector dial will prove satisfactory in every case, for the CRUCIBLE TOOL STEEL SELECTOR covers 22 tool steels which fit 98% of all Tool Steel applications. ALL the tool steels on the Selector are in Warehouse Stock . . . that means when you get the answer, you can get the steel . . . fast!

Write for your Selector today! We want you to have it, because we know you've never seen anything that approaches your tool steel problems so simply and logically. Just fill out the coupon and mail. Act now!



**Selector diameter 9", in 3 colors**

**Crucible Steel Company of America**  
Dept. MS, Chrysler Building  
New York 17, N. Y.

**Gentlemen.**

Sure! I want my CRUCIBLE TOOL STEEL SELECTOR!

Name \_\_\_\_\_ Title \_\_\_\_\_

Company

**Street:** \_\_\_\_\_

**City** \_\_\_\_\_ **State** \_\_\_\_\_

First name in special purpose steels

# CRUCIBLE

# TOOL STEELS

fifty years of Fine steelmaking

**Branch Offices and Warehouses:** ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI  
CLEVELAND • DENVER • DETROIT • HOUSTON • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN  
NEW YORK • PHILADELPHIA • PITTSBURGH • PROVIDENCE • ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD,  
MASS. • ST. LOUIS • SYRACUSE • TORONTO, ONT. • WASHINGTON, D. C.

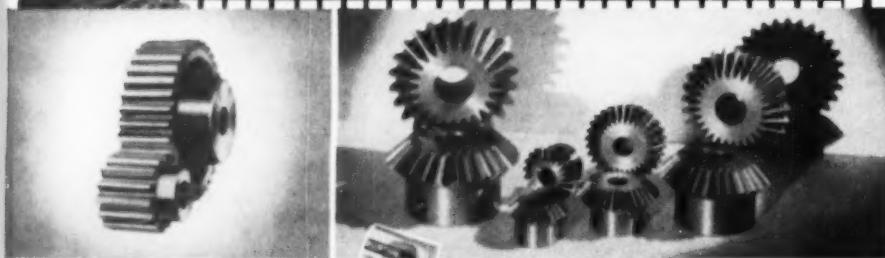
## Important Notice to all readers of Modern Machine Shop

### BOSTON GEARS cut $20^{\circ}$ Pressure Angle

Quieter — Longer Life

- TRANSMIT MORE HORSEPOWER
- RUN QUIETER • LAST LONGER

ASK THE NEAREST BOSTON GEAR DISTRIBUTOR to show you a pair of Boston Gears cut  $20^{\circ}$  Pressure Angle. See for yourself why they are stronger and will take loads otherwise requiring heavier pitch, larger pitch diameter, more expensive,  $14\frac{1}{2}^{\circ}$  angle gears. Design them into your equipment.



BOSTON SPUR GEARS cut  $20^{\circ}$  Pressure Angle are stocked in 12 - 10 - 8 - 6 and 5 pitch sizes. Consult your new Boston Gear Catalog No. 55.

FOR COMPLETE INFORMATION on Boston Gears write for free copy of Boston Gear Catalog No. 55.

ALL BOSTON STEEL MITER GEARS are made with a  $20^{\circ}$  Pressure Angle and with flat (not "cupped") gear end surface for quick, compact, precise assembly and quick, sure alignment when installed. Available from nearby stock. See Catalog No. 55.

**BOSTON** *Gear stocks are Near*

### BOSTON GEAR WORKS

68 HAYWARD ST., QUINCY 71, MASS.



Deep Groove Bearings



Sprockets



Bevelizers



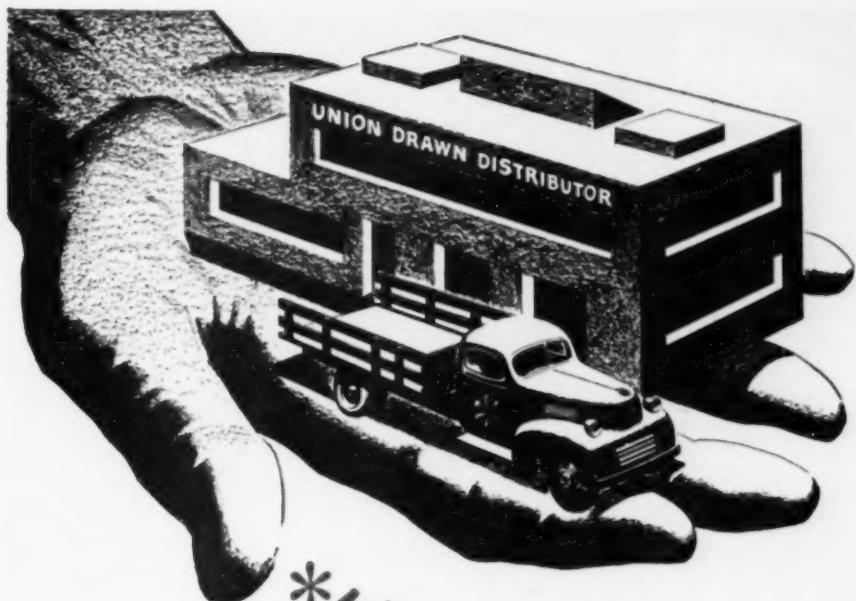
Pillow Blocks



Universal Joints



Couplings



\**Yours* ... FOR THE ASKING

A SILENT PARTNER



An expertly operated super-stockpile of steel bars and shafting plus a fast fleet of trucks to make it mobile. That's what your nearest Union Drawn Distributor has to offer you—and it's *yours for the asking*.

His is an ample, widely-diversified, fast-moving stock—production supply line for many successful plants and shops in your area.

His deliveries are fast—a bar at a time or a truckload. With his specially trained personnel and his carefully classified stock, he is able to *pace* your production.

Successful operators everywhere are finding it highly profitable to make use of such a partnership—HIS stockpile, *their* stockpile . . . HIS stocklist, *their* inventory. Why not call for *your* copy of his stocklist today?



PHONE YOUR  
UNION DRAWN  
DISTRIBUTOR

*Today!*

**Republic UNION  
COLD DRAWN STEELS**

*Now*

# Dialize Your AGD Snap Gages



Your AGD  
Adjustable Limit  
Snap Gage



STANDARD

*Dializer*



Low Cost  
Dial Gage

\*Patent Applied For

*Easy to  
Install*

Remove a pair of pins from an AGD Adjustable Limit Snap Gage . . . install this new STANDARD Dializer . . . and you have an indicating DIAL SNAP GAGE! It's as easy as that . . . and far less expensive than buying an equivalent dial snap gage.

Dializer No. 1 for frames 1-6

Dializer No. 2 for frames 7-10

Dializer No. 3 for frames 11-16

## OUT of the LUXURY CLASS!

NO LONGER can you afford to be without the benefits of quantitative dial measurements. The STANDARD Dializer is priced way below an equivalent Dial Snap Gage. Even if you have to buy a new AGD snap to convert, you save on an overall basis.

- ★ EASILY INSTALLED in your AGD Adjustable Limit Snap Gages . . . any make.
- ★ CONVERTS any AGD Model — A, B or C, any size.
- ★ RANGE OF ADJUSTMENT is same as before dializing.
- ★ INDICATOR furnished with either .0001" or .001" graduations.

★ ASSURES ACCURACY by use of double reed principle.

**STANDARD GAGE CO., Inc., Poughkeepsie, N.Y.**

# Simplify and **SPEED-UP** Drilling and Centering Operations...



## By Using Power Feed and Power Clamping

You'll get fast, accurate drilling or centering on one or both ends of work pieces with the Sundstrand 53A Drilling and Centering Machine. It has four possible spindle speeds which are quickly and easily obtained by interchanging pulleys and vee belts.

The 53A Drilling and Centering Machine is usually furnished with power feed and power operated vises. Hand control for feed and manually operated

The Sundstrand 53A Drilling and Centering Machine above handles work up to 4" dia. by 24" long. Longer bed machines are also available for maximum lengths of 48 or 72 inch work pieces.

vises can also be furnished or a combination of power feed and hand operated vises or manual feed and power operated vises. When provided with power operated vises, operator can clamp long work near each end from one central push button station.

Hand feed and power operated vises are available at lower cost. Investigate these time-saving machines today.

## FREE DATA

This bulletin contains complete specifications and data on this modern Sundstrand Drilling and Centering Machine. Complete specifications for both power and hand feed machines are included. Write for your copy today. Ask for bulletin 503.



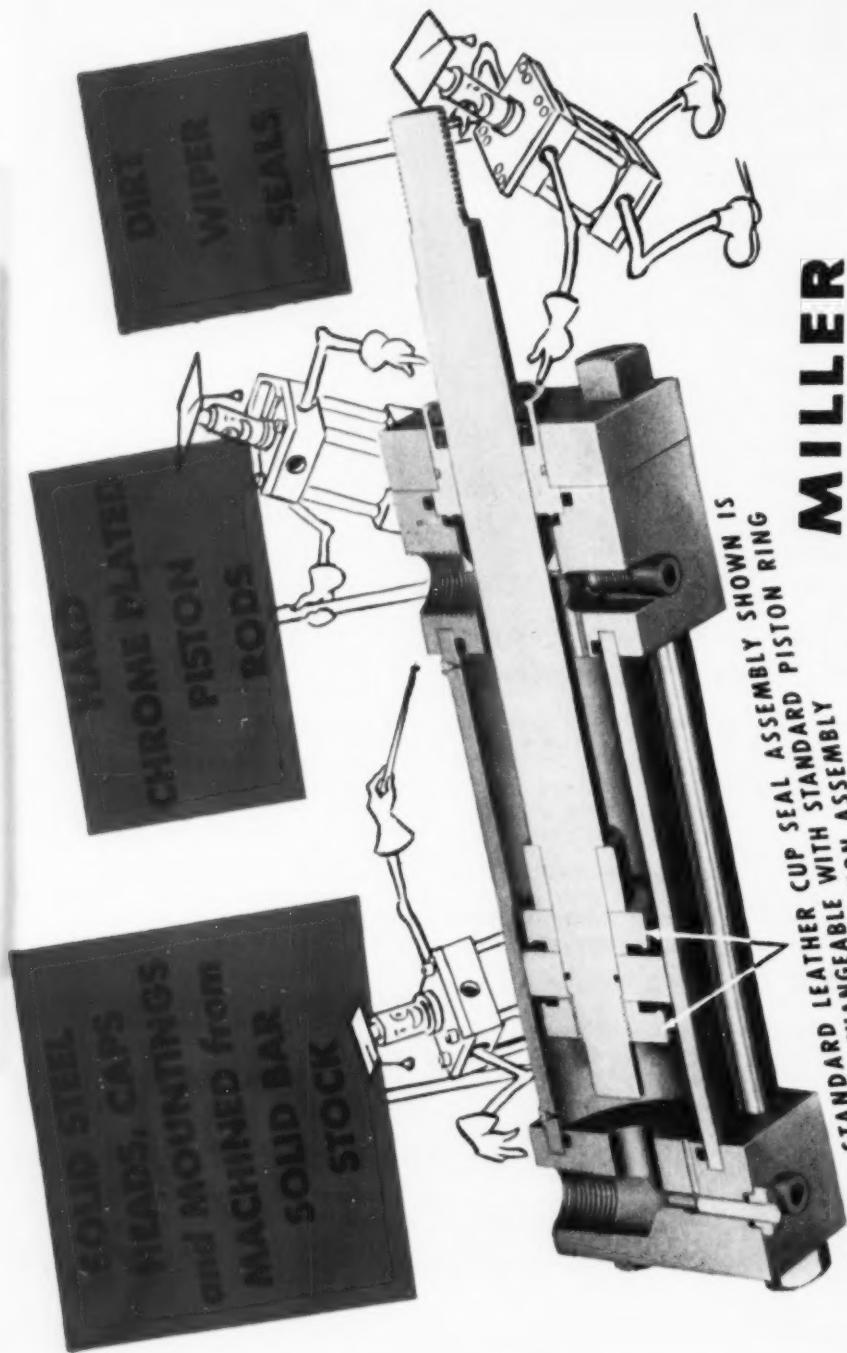
  
**SUNDSTRAND**  
**MACHINE TOOL COMPANY**

2539 Eleventh St. • Rockford, Ill., U.S.A.

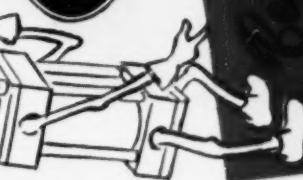
*High Pressure*

## MILLER

ASSEMBLY SHOWN IS  
STANDARD CUP SEAL ASSEMBLY  
STANDARD LEATHER WITH ASSEMBLY  
INTERCHANGEABLE PISTON



61



# HYDRAULIC CYLINDERS

## Meet J. I. C. HYDRAULIC STANDARDS

Years before the Joint Industry Conference (J. I. C.) Standards for specifying "quality" hydraulic equipment were adopted, the standard design and construction features of Miller High Pressure Hydraulic (2000-3500 psi) Cylinders already included ALL the specifications for cylinders, seals and pistons now called for by the "Standards". Hard chrome plated, scratch-resistant piston rods and dirt wipers have long been standard Miller cylinder features yet are required by the "Standards" only under severe conditions.

Solid steel heads, caps and mountings which eliminate costly, dangerous breakage even under the severest operating conditions represent an "extra-quality" standard Miller cylinder feature which actually exceeds the high quality set by the J. I. C. Standards.

The Miller "Patented" Hydraulic Piston Rod Seal which has no manual adjustment and is automatically self-adjusting and wear-compensating to give life-long leakproof service without ever requiring any manual adjustment whatsoever . . . far surpasses the requirement of J. I. C. Standard H6.2.5 which specifies "Stuffing boxes for automatic packing shall be designed as to prevent adjustment beyond the functional limits of the packing."

Write for illustrated cylinder bulletins A-105 and H-104

COMPLETE MILLER CYLINDER LINE INCLUDES AIR CYLINDERS, 1½" TO 20" BORES, 200 PSI OPERATION, LOW PRESSURE HYDRAULIC CYLINDERS, 1½" TO 6" BORES FOR 500 PSI OPERATION, 8" TO 14" BORES FOR 250 PSI HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES, 2000-3000 PSI OPERATION, ALL MOUNTING STYLES AVAILABLE.



MILLER MOTOR COMPANY  
DEPT. M, 4027 N. KEDZIE AVENUE

CHICAGO 18, ILLINOIS

BRAND HYDRAULIC CYLINDERS ACCUMULATORS COUNTERBALANCE CYLINDERS BOOMS AIR HOISTS

CLEVELAND — PITTSBURGH — PHILADELPHIA — DETROIT — YOUNGSTOWN — BOSTON

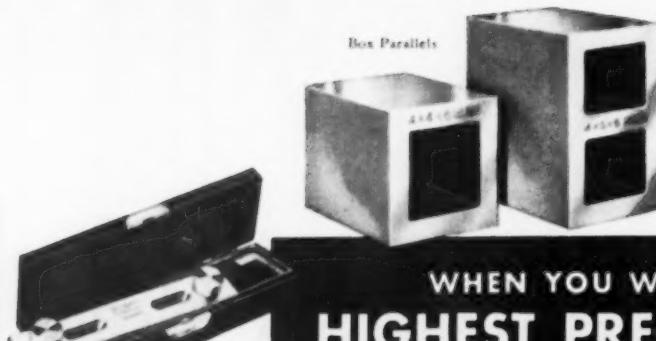
HARTFORD — NEW YORK CITY — DAYTON — ST. PAUL — PORT WAYNE — INDIANAPOLIS

MILWAUKEE — NASHVILLE — SEATTLE — LOS ANGELES — SAN FRANCISCO — BALTIMORE

Sales and Service from coast to coast

ST. LOUIS and OTHER AREAS.

© 1948 Miller Motor Company, Chicago 18, Illinois. All rights reserved.



**WHEN YOU WANT  
HIGHEST PRECISION**  
*In Inspection and  
Production Tools*

... Specify **TAFT-PEIRCE**

Taft-Peirce Inspection and Production tools are designed and built to the quality standards of the world's most famous toolroom. The finest grades of alloy steel, careful heat treatment, exact finishing produce unequaled precision — the precision you require to ensure true accuracy in your set-up, layout, and inspection work. For further information on these and many other aids to manufacture,

write today for your copy of the new Taft-Peirce Handbook.

**The TAFT-PEIRCE  
Manufacturing Company**

WOONSOCKET RHODE ISLAND



**TP means TOP PRECISION**



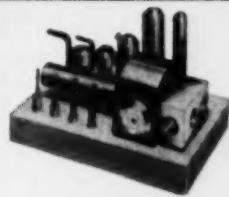
#### MILLING MACHINE VISE

This improved vise provides greater gripping power. It is streamlined for appearance and is furnished with a large diameter screw for rigid holding. A coolant trough is also provided. Two sizes are available: 5" x 3½" and 6" x 5" jaw openings.



#### RIGHT ANGLE ATTACHMENTS

These attachments are available in two types, heavy duty and light duty. The heavy duty type, made in two sizes, will mill and drill at right angles and fits both the Master and the 1 H.P. Bridgeport Milling Heads. The light duty type is especially designed to mill and drill narrow, deep molds and cavities.



#### No. 2 BORING HEAD

Boring tools and holder make this attachment capable of boring holes up to 6" diameter. It is available for use on the Bridgeport 1 H.P. Milling, Drilling and Boring Attachment.

# *Bridgeport*

## TURRET MILLING MACHINE *versatility and capacity are even greater than ever before . . . through ATTACHMENTS AND 1 H.P. HEAD*

Many more operations can now be performed with speed, convenience and accuracy through the use of these attachments, specially designed for the "Bridgeport." With the step up in capacity provided by the 1 H.P. head, a wider variety of heavier work can now be handled on this universally accepted machine, more than 12,000 of which are busy today in tool room and production line service.  
May we suggest that you get full information immediately on this machine and its attachments.

*Complete details on any and all attachments and  
machines available promptly on request.*



# *Bridgeport* **MACHINES, INC.**

*Bridgeport, Connecticut*

*Manufacturers of High Speed Milling Attachments and Turret Milling Machines*

# SOUTH BEND 2-H TURRET LATHE



## Keeps Costs Down on Precision Parts

This precision-built turret lathe is designed specifically for the machining of accurate, duplicate parts. It is especially suited for large-volume, second operations that require close tolerances and smooth finishes.

The choice of 48 power cross feeds, power longitudinal feeds and thread cutting feeds and the 96 power turret feeds provide combinations for maximum cutting efficiency. Find out now how this precision turret lathe can help keep down your costs.



**MODEL 2-H  
TURRET LATHE**  
with 6' bed (28 $\frac{1}{4}$  max.,  
spindle nose to turret  
face); 1" collet capacity;  
2-speed, 3 ph., 440 V.,  
A.C. motor, controls,  
f.o.b. factory \$3021.75  
Handlever collet attachment,  
coolant pump and  
splash pan extra.  
*Time Payments available*



**SOUTH BEND LATHE**

SOUTH BEND 22, IND. • Building Better Tools Since 1898

Send Information on:

- LATHE ATTACHMENTS     8" and 10" BENCH LATHES     10" to 16-3/4" FLOOR LATHES     14" DRILL PRESSES     BENCH SHAPERS
- 2-H TURRET LATHE     TIME PAYMENT PLAN

NAME

COMPANY

STREET

CITY & STATE

# Better check into this tool!



## DUMORE DRILL HEAD GIVES 97% COST REDUCTION ON TOUGH JOB

"Saving on first 4½ hours production on this one operation, repaid the cost of the drill head," says Harold Forsmark, Chief Engineer of Stiger Precision Products, Inc., Cicero, Illinois.

### OLD WAY — \$385 per piece

Problem was to drill 2 tie-wire holes at an angle thru 1"x1"x $\frac{1}{2}$ " stainless steel nut of 15 - 20 Rockwell hardness with a No. 50 drill. Maximum production with hand-fed press was 10 pieces an hour and operator broke from 14 - 18 drills per day at a cost of 20c per drill.

### DUMORE WAY — \$.0117 per piece

With the Dumore Drill Head, Stiger gets 120 pieces an hour and has eliminated drill

breakage and scrap loss. Says Forsmark, "We set the pressure and the compressed air chamber of the Dumore Drill Head controls it automatically and changes feed and speed to match the material. This means the drill head 'walks' right down."

If you're using No. 80 to  $\frac{1}{8}$ " drills, it will pay you to get the facts on the New Dumore Automatic Drill Head. Call your Dumore Distributor today for a demonstration. Free 16-page bulletin on request.

THE  
**DUMORE**  
COMPANY

Dept. M-33, Racine, Wis.

Export Address: 13 East 40th Street  
New York 16, N. Y., U.S.A.

DDH-5

Tool post  
Grinders

Handgrinders

Router

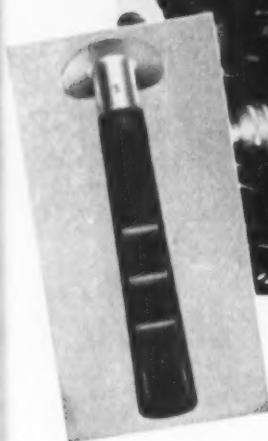
High Speed  
Drill Press

Quills

Flexible  
Shaft  
Tools



*how to handle  
high assembly costs*



**KURZ-KASCH, Inc.**

**DAYTON, OHIO**

• On an order for 120,000 plastic handles, to which metal sockets had to be attached, Kurz-Kasch, Inc., pioneer planners and moulders in plastics, found that manual assembly methods averaged only 125-150 units per hour per man . . . ran assembly costs dangerously high.

Converting to Buckeye air-powered screwdrivers, Kurz-Kasch stepped up productive output to 225-250 units per hour—a 66½% increase that kept assembly

costs in line, assured a profitable production operation.

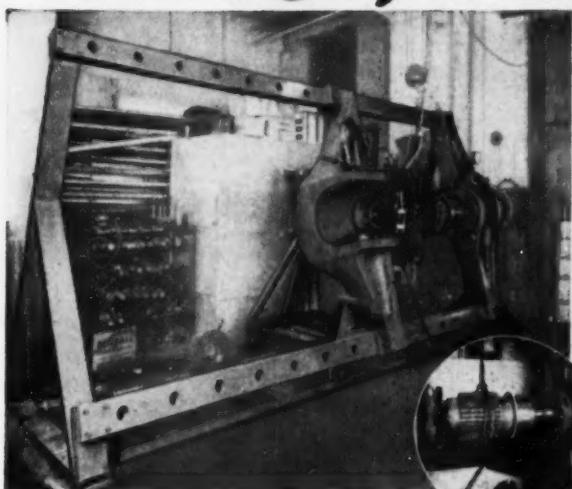
In any business—including yours—there's a real need for efficient, modern Buckeye Air Tools. Screwdrivers, drills and nut runners . . . grinders, buffers, sanders . . . wrenches, shears and nibblers . . . there's a Buckeye Tool to do your work—faster, better, more economically. We'll prove that—in your plant, on your job—without obligation.

**Buckeye Tools**  
CORPORATION  
DIVISION 17 • DAYTON 1, OHIO

Portable Air  
and Electric Tools  
for Industry

**For Fast, Efficient Pressing,  
Bending, Forming, Straightening...**

# New Rodgers FORCING PRESSES



## ...With These Features of Construction and Operation

**SEPARATE PUMPING UNITS**—Choose from individual hand-operated or power-driven pumps to operate any model Rodgers Forcing Press. **REMOTE CONTROL OF POWER PUMPS**—Operator can control press from any desired position. **REMOVABLE HYDRAULIC CYLINDER**—Cylinder is easily removed from head member to permit servicing or use for other power applications. **INDIVIDUAL FRAME UNITS**—Tracks, tension bars, abutment member and head member are all separate units to facilitate handling and erection of press. **EXPERTLY ENGINEERED AND CONSTRUCTED**—All units of Rodgers Forcing Presses are made strong, durable and dependable to give years of reliable service.

## ...In These Types and Sizes

Rodgers Versatile Forcing Presses are available in portable or stationary models—horizontal, vertical, 75° or 90° inclined—100 to 600 tons—with hand-operated or power-driven pumps. In this broad selection, you'll find the ideal press to meet your requirements.

Rodgers 300 Ton, 75° Inclined, Stationary Forcing Press, one of many in the complete Rodgers line. In the application shown, the press is being used efficiently to press an armature shaft.



## Separate Power Pump

Select your press operating unit from hand-driven pumps or power-driven pumps. Shown is a Rodgers 2-cylinder Power Pump with remote control.

## Send for New Catalog

For full details and specifications on the complete line of Rodgers Forcing Presses send for Catalog 315.

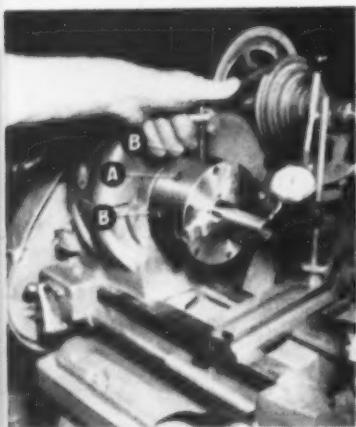


# Rodgers Hydraulic, Inc.

7447 Walker St., St. Louis Park, Minneapolis 16, Minn.

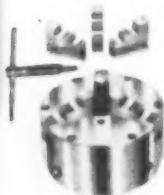
**HYDRAULIC POWER EQUIPMENT**

# THE MOST VERSATILE CHUCK YOU CAN BUY!



## FIRST CHUCK ADVANCE IN 50 YEARS!

Operating principle is revolutionary, but simple. Pinion 'A' moves jaws in or out to grip work like any scroll chuck. 4 opposed screws 'B' bring work to dead center. So easy that inexperienced men can center work within .0005 in 3 minutes! Once set dead true, you can machine hundreds of duplicate parts without changing adjustment!



3 STEP-JAW CHUCK  
3 sizes—  
4", 5", 6"



6 STEP-JAW COLLET CHUCK  
3 sizes—  
4", 5", 6"



6 JAW PRODUCTION COLLET CHUCK  
3 sizes—  
4", 5", 6"



## NEW DESIGN PRINCIPLE

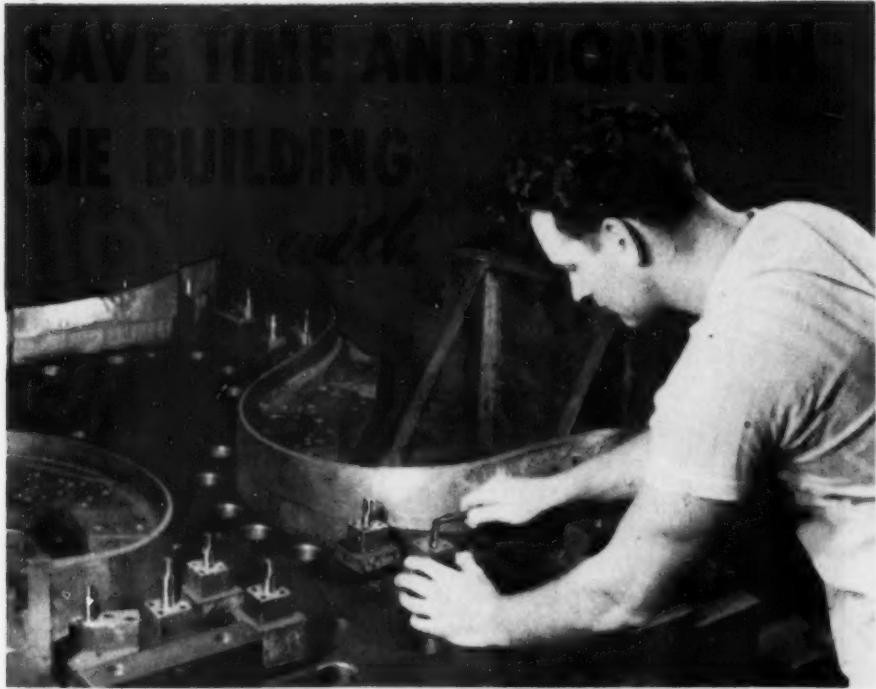
1. Gives .0005 precision with scroll chuck rechucking speed!
2. Performs collet and step-collet operations!
3. Ends most needs for stub arbors and mandrels!
4. Compensates for spindle run-out — lengthens useful life of old machines!
5. Can be adapted to dividing heads, grinders, screw machines!

Buck Ajust-Tru Chucks are man-hour savers on any production team. Bring new speed in setting to dead true, plus spindle collet capacity from  $\frac{1}{4}$ " to  $1\frac{1}{2}$ " by .001, plus step collet capacity of  $\frac{1}{2}$ " to 5" by .001 (on 6" chucks). Do work of special equipment worth \$250 to \$1,000 at ordinary scroll chuck prices—in much less time.

Send for literature today.



BUCK TOOL COMPANY  
1214 Schippers Lane • Kalamazoo, Mich.



## R-B\* INTERCHANGEABLE PUNCHES and DIES

R-B punches and dies cut die-making costs because they permit use of standardized R-B retainers which are quickly and accurately mounted. Completely interchangeable, R-B punches and dies consequently reduce large inventories.

Quickly and easily installed, yet accurately located and securely locked both vertically

and radially, R-B punches and dies reduce press "down time" too, because they enable operators to make quick changes.

R-B standard punches and dies are stocked for immediate delivery. Punches and dies of special sizes, shapes and materials are made promptly to your specifications.

*\*Richard Brothers*

GET THE WHOLE STORY IN THIS 48-PAGE FREE CATALOG →

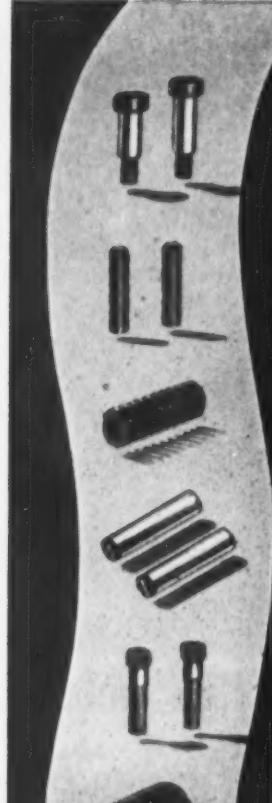


**ALLIED PRODUCTS CORPORATION**

**RICHARD BROTHERS DIVISION**

DEPARTMENT 50 • 12625 BURT ROAD • DETROIT 23, MICHIGAN

Also Produced in Allied's Four Plants . . . HARDENED AND PRECISION GROUND PARTS • STANDARD CAP SCREWS • SPECIAL COLD FORGED PARTS SHEET METAL DIES • ALLITE DIES CAST OF ZINC ALLOY • JIGS • FIXTURES



*All Standard Accessories  
Ready to Go Immediately*

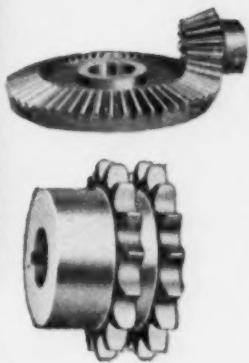
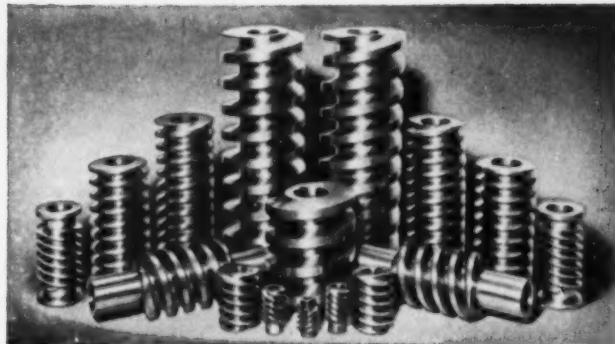
**DETROIT DIE SET CORPORATION**  
immediately on receipt of order  
ships all standard items in a wide  
range of sizes . . . dowel pins, die  
springs, stripper bolts, socket grip  
head cap screws and other acces-  
sories. All are nationally known  
products manufactured with the  
same precision as "DETROIT" die  
sets. For dependable shipment,  
"phone, wire or write "DETROIT."

**CALL "DETROIT"**

DETROIT	TR 2-5150
BIRMINGHAM, ALA.	7-4121
BUFFALO	PA 9206
CHICAGO	PU 5-7894
DAYTON	HE 3042
GLEN RIDGE, N. J.	GL 2-5658
INDIANAPOLIS	HU 5604
LOS ANGELES	AD 7251
MILWAUKEE	GI 3-7170
MONTREAL, CAN.	WI 1186
PHILADELPHIA	VI 4-4084
PITTSBURGH	Perryville 3-203
ROCK ISLAND, ILL.	8-2814
ST. LOUIS	FR 6811
ST. PAUL	CE 1600
SEATTLE	LA 7109
TOLEDO	GA 5206
TORONTO, CAN.	PL 3813
WICHITA	5-8681
WINDSOR, CAN.	2-1375

**DETROIT DIE SET CORPORATION**  
2895 W. GRAND BLVD. • DETROIT 2, MICH.

**DETROIT  
DIE SET \***



**the ADAMS line**

SPUR GEARS  
HELICAL GEARS  
BEVEL AND MITER  
GEARS  
WORMS AND WORM  
GEARS  
SPROCKETS  
INTERNAL GEARS  
(Spur and Helical)  
RATCHETS  
SPLINED SHAFTS  
RACKS  
LEAD AND FEED  
SCREWS  
SHAVE TOOTH  
GEARS (Spur and  
Helical)  
GROUND THREAD  
WORMS

*Are you looking for  
ways to improve your product?*

Check these advantages of Adams custom made gears:

- ✓ Made by skilled gear craftsmen.
- ✓ Cut on modern precision machines.
- ✓ Careful inspection and control throughout manu-fac-ture.
- ✓ Exact conformance with your specifications.

Adams gears are made to suit the particular requirements of your product and to make that product perform as efficiently and dependably as possible. Investigate the advantages of Adams custom made gears for your needs. Write THE ADAMS COMPANY, 1942 Cypress St., Dubuque, Iowa.

**The ADAMS Company**  
**Dubuque, Iowa, U. S. A.**

ESTABLISHED 1883

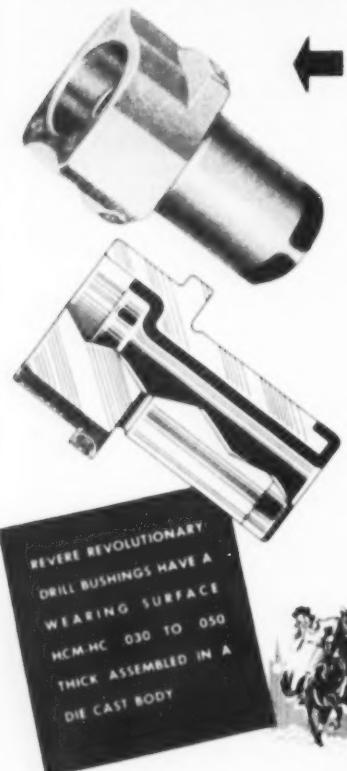
FINE GEARS MADE TO  
YOUR SPECIFICATIONS





**Revere BUSHINGS WEAR 6 TO 30 TIMES  
LONGER THAN ALL STEEL BUSHINGS**

WE ONLY CLAIMED 3 TO 4 TIMES THE LIFE OF TOOL STEEL



Revere Revolutionary Drill Bushings have all the accuracy of solid type bushings. Made of Super Pressed High Chrome, High Carbon Steel, Revere bushings last longer, wear better, and are assembled from complete stocks near you.

# SAVE ON

FIRST COST  
CHANGE TIME  
INVENTORY  
MACHINE DOWN TIME

The Revere Drill Bushing comes to you as the result of 30 years of continuous bushing experience. This experience, plus our new Revolutionary method of making drill bushings means lower cost and higher quality.

**Revere Fisher ENGINEERING CO.**

NORTH BRANCH, MICHIGAN

# FIRST CHOICE OF TOOL ENGINEERS FOR DEFENSE WORK



## The OLIVER ACE Universal Tool and Cutter Grinder



The sound engineering, efficiency and economical operation of the Oliver Ace Cutter Grinder appeals to the tool engineer. This fact is reflected in the great number of Olivers in use in the tool rooms of the world's greatest industrial plants.

The Oliver Ace Tool and Cutter Grinder is fast, simple to operate, easy to set up, requires few fixtures, and will handle a wider range of cutters than the ordinary cutter grinder. The Oliver Ace will expedite your tool making and save many man-hours in your operation.

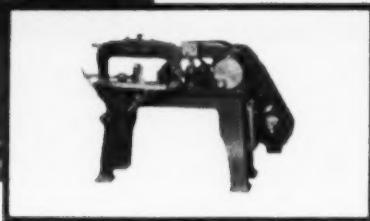
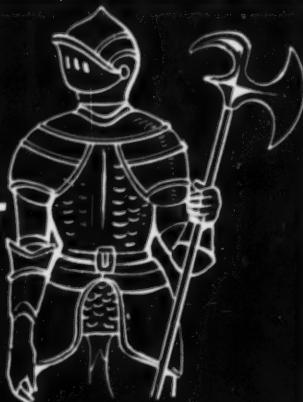
**WRITE OLIVER FOR THE NEW TECHNICAL BULLETIN ON THE OLIVER ACE UNIVERSAL TOOL AND CUTTER GRINDER.** Illustrated above is the new Oliver Heavy Duty Ace Universal Tool and Cutter Grinder. This machine is especially designed for hard metals. Also available is the Oliver Ace Standard Cutter Grinder—designed for high speed grinding.

## OLIVER INSTRUMENT CO.

1430 E. MAUMEE • ADRIAN, MICHIGAN

AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS—DRILL  
POINT THINNERS—TEMPLATE  
TOOL GRINDERS—FACE MILL  
GRINDERS—DEMATING MACHINES

# OLD WARRIORS ANTIQUE MACHINES OBSOLETE METHODS--OUT



Stop the penalties, the losses, the drop in profits that old equipment costs you. Modernize the first step in your metal working processes with late design RACINE Power Saws.

A new, *all hydraulic* RACINE saw to replace worn, obsolete equipment, another unit added to your production line will pay their way in every shop.

RACINE'S line is complete — capacities 6" x 6" to 20" x 20". Single purpose and fully automatic bar feed models. A word to us about your metal cutting needs will bring carefully prepared engineering estimate sheets. Costs you nothing — can save you much. RACINE TOOL & MACHINE COMPANY, 1770 State St., Racine, Wis.

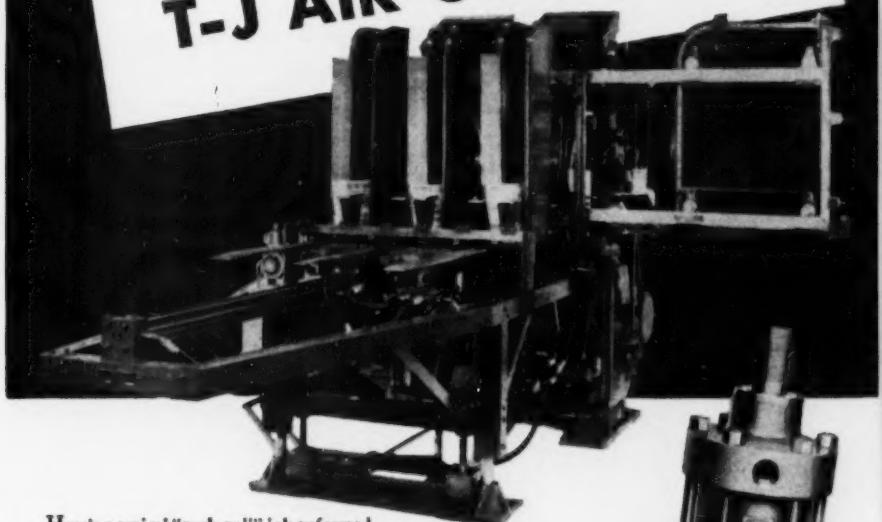
**RACINE**  
STANDARD FOR QUALITY AND PRECISION



Job File No. 4617

# NAILING MACHINE

feeds wood strips automatically with  
**T-J AIR CYLINDERS**



Here's a typical "push-pull" job performed  
efficiently by T-J Cylinders!

This special nailing machine—equipped with T-J Air Cylinders—is built by Morgan Machine Co., Inc., Rochester, N.Y., for use by Hotpoint in Chicago. The machine is employed to make up skids for mounting electric ranges for shipment. The three boards as shown in the hoppers on top of the machine feed down one at a time while a cross piece from the hopper extended to the right of the machine is fed in. The long T-J Cylinder projecting out in front of the machine feeds the three boards ahead the proper distance and then stops to have a cross piece nailed to them. It then advances automatically to next position until four cross pieces are nailed to the three lateral strips.

For your tough jobs in power movement — pushing, pulling or lifting — save labor, speed production and cut costs with T-J Air and Hydraulic Cylinders! Many standard sizes and styles... both cushioned and non-cushioned types... 100 lb. or 50,000 lb. Precision-built, versatile, long life. Write for additional information. The Tomkins-Johnson Co., Jackson, Mich.

FOR POWER MOVEMENT IN ANY DIRECTION



100 LB. or 50,000 LB.

33 YEARS EXPERIENCE

**TOMKINS-JOHNSON**

DISTRIBUTOR OF T-J HYDRAULIC CYLINDERS, CUTTING CYLINDERS



# ARMSTRONG

## TOOL HOLDERS . . .

### for every operation!

There are ARMSTRONG TOOL HOLDERS in sizes and types for every operation on lathes, planers, slotters and shapers—for the heaviest cuts; for the most delicate cuts.

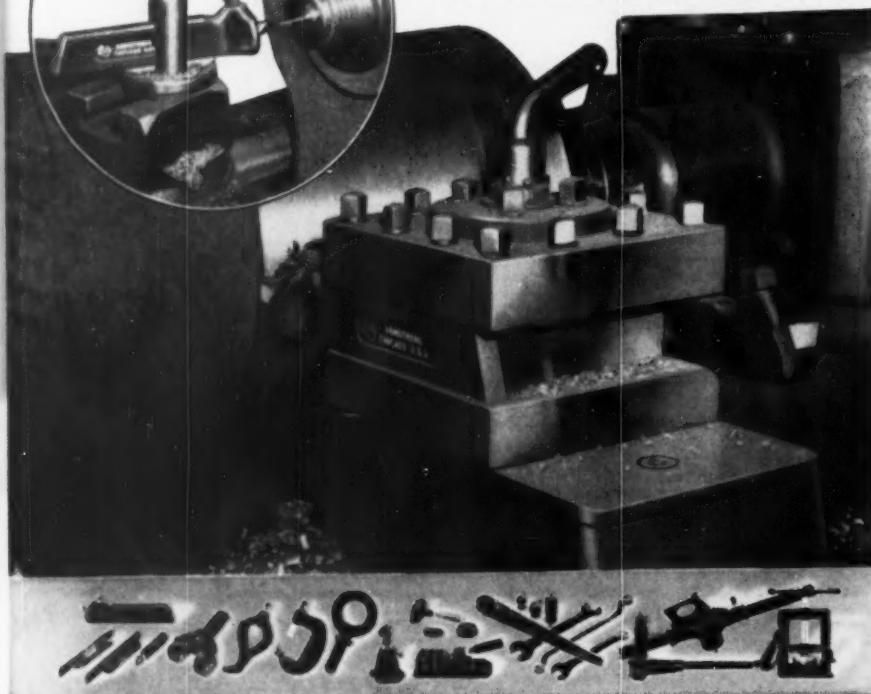
With Standard shaped cutters, bits and blades of ARMSTRONG HIGH SPEED, ARMALOY (Cast Alloy) and ARMIDE (Carbide-Tipped) they provide a system of tooling that assures maximum production per machine hour, lower tool costs, and higher machining profits.

These permanent multi-purpose tools can be picked up as needed from your industrial distributor. Use them wherever possible to increase number of pieces per hour, to lower cost per pieces.

*Write for Catalog.*

**ARMSTRONG BROS. TOOL CO.**

"The Tool Holder People"  
5228 West Armstrong Ave., Chicago 30, Illinois



# WELDING

DECEMBER, 1959

Vol. 33 No. 12

**Magnetic 1-Second Welding Times** *By W. H. Johnson*  
An analysis of the magnetic welding methods now put forward  
in the industry of magnet welding. The author covers the basic  
method and gives his own researches in magnetic welding and magnet  
severing. Two new designs and improvements are shown with  
photographs and drawings.

## Toolbox for Auto Production

*By Franklin D. Smith*

This story of General Motors' 2000-mile road test of  
an assembly line indicates how minimum and maximum  
productivity is maintained with present plant equipment. Page 111.

## Simple Plant Equipment Orientation

*By Robert E. Gandy*

The author describes the manner in which a West Coast company  
uses three standard tools to minimize lubrication required  
in heavy-duty equipment operating elsewhere. Page 118.

## Smoothing Work on Circular Tools

*By C. W. P. Jones*

This section gives the setup and evolution of dies including  
a variety of tool parts to create several surfaces for smooth  
finished work pieces. It is also explained. Page 126.

## Trimming Body Shims at Standard

*By Robert E. Gandy*

A description of the development of a tool especially built  
for cutting durable body shims. Page 132.

## Equipment Plus Techniques Equals Wheel Turningplus

*By Arthur L. Johnson*

In this article the author describes the unusual wheel turning  
technique developed in the Southern Pacific Company's Los  
Angeles shops for turning wheels of railroads' vehicles.  
Page 146.

## New-Style Body Safety Seats Now Available

*By Robert E. Gandy*

This article was written for the exhibition of safety seats  
at the 1959 National Safety Congress, sponsored by the  
American Society for Testing Materials, in New York,  
on October 26 and 27. Page 154.

## COMING NEXT MONTH

### Combination of Metal Cutting Research & Manufacturing

*By Harry J. Johnson*

This article will deal with pertinent methods for determining  
proper cutting feeds and speeds. Everyone who works with  
metals or operations will find valuable information in this  
article.

# Magnetic Tracing-- A Flame Cutting Production Aid

In which the author explains the fundamentals of magnetic tracing and describes several practical applications.

By H. G. FROMMER

Chief Tool Engineer, Trackson Company, Milwaukee, Wisconsin

WELDING'S great companion method—flame cutting—is not being used to its fullest advantage by

many, unless proper, and sometimes complex tools are utilized. The oxy-acetylene torch is capable of doing much more than ordinarily assumed, especially in the cutting of intricate shapes, in the reduction of costs for all sizes of production runs, in the elimination of pattern costs, delays, and purchasing problems. If handled intelligently, great accuracy can be achieved and maintained. Attainment of accuracy and efficiency—the prime requisites of good production—are usually functions of the tool engineer and method man, without whom a modern shop does not fare well. Why then neglect this important phase

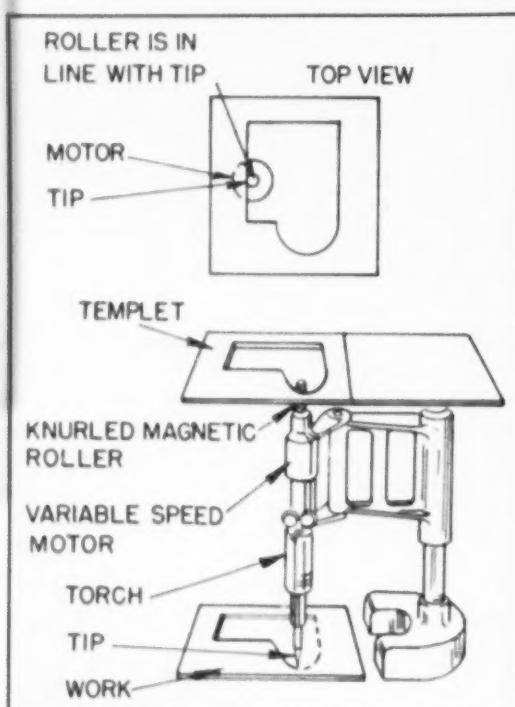


Fig. 1—Illustration showing magnetic tracer setup in which the tracing device forces the torch to describe a path identical to that of the outline of the templet, the tracing device being in direct connection with the torch.

of production engineering by giving a part print to a templet maker without having previously given him the necessary schooling and information?

Several methods of tracing may be used in conjunction with oxy-acetylene flame cutting: Oxy-acetylene flame

follows a drawn outline; (4) Magnetic tracing, which is becoming more and more popular for reasons of simplicity, economy and it's many possibilities for intricate templet design. This method is fully automatic and does not require the operator's constant attention.

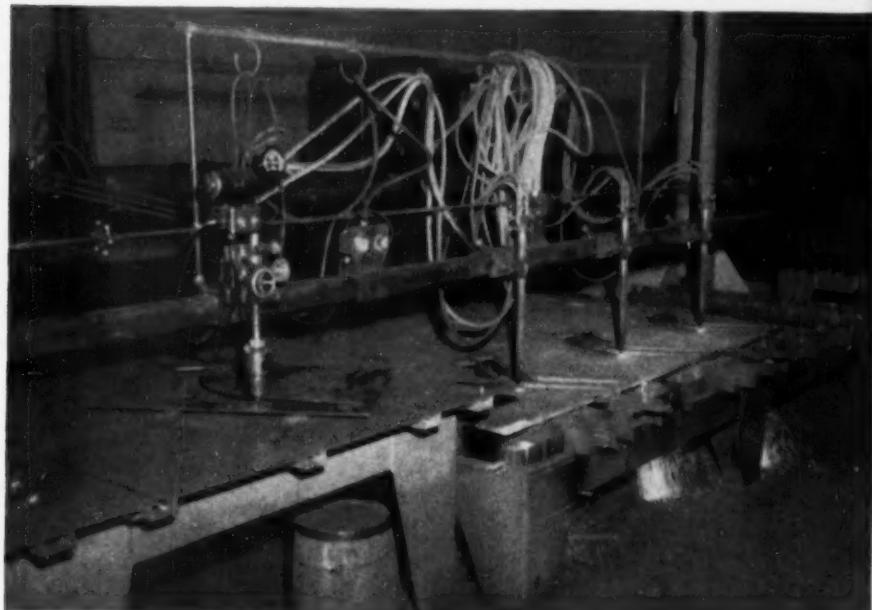


Fig. 2—General arrangement of one of the larger types of flame cutting machines. The tracing table is located at the left and the cutting table at the right. Note magnetic tracer within the female templet, while three torches are cutting identical outlines.

cutting uses several methods of tracing: (1) Semi-manual method, by which a rotating, knurled disk is utilized, which is guided by the operator's hand to follow an outline, usually a drawing; (2) Track tracing, whereby a driving mechanism is led along a templet made of a metal strip bent to the outline of the workpiece desired; (3) Electronic tracing, a rather new development. There, as in method (1), no templets are needed as the driver

to the tracing device; and (5) Spindle tracing, which is similar to magnetic tracing, except that the operator must provide friction thru constant pressure applied manually to the spindle in order to achieve movement of the tracing device.

The semi-manual method and the electronic tracing device will not be discussed here because no templets are required and because the first is seldom used for mass production, while

the latter requires a rather sizable investment for equipment and therefore has not as yet found widespread acceptance in industry. Spindle tracing, too, is impractical for any larger production runs. Track tracing does re-

analysis, starting with the fundamentals and extending into several practical applications.

The magnetic tracer consists of a knurled roller of predetermined size. Electrically magnetized, motivated by



Fig. 3—The torch has just started cutting a recess out of a length of structural steel angle which is mounted in a holding fixture. After cut is completed, angle is re-inserted in holding fixture for a cut on opposite leg. Magnetic tracer and templet are not shown, since they are located on a separate table at the right. Torch set at angle is used to pre-heat edge.

quire templets but these are simple bands of metal, usually aluminum or steel strips, which do not lend themselves to variations of templet design and which cannot be used to obtain workpieces with sharp corners, small recesses or of otherwise intricate makeup. Magnetic tracing, on the other hand, is the subject of this

a variable speed motor, it pulls itself along the edge of a steel templet. In direct connection with the torch or torches, the tracing device forces the torch or torches to describe a path identical to the outline of the templet. Flame cutting machines employing such tracers are made in various models by several manufacturers, yet

templets can be interchanged readily as long as the same roller diameter is used. On some machines—usually on the very small sizes—a variable speed motor is mounted on top of the torch, as shown in Fig. 1, while the larger ones utilize one end of a long movable arm for the tracing mechanism and the other end for one or several torches, as shown in Figs. 2 and 3. Here, some forethought exerted by the de-

signer will allow use of the same templet on either type of machine, permitting "last-minute" rescheduling of work by the production department.

$A = R_r \pm \frac{K}{2}$ , the algebraic sign depending upon the class of templet.

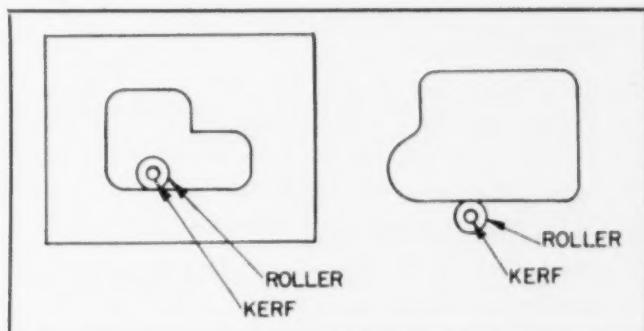
**A**—templet maker's allowance

**R<sub>r</sub>**—radius of tracer roller

**K**—kerf width, which is the width of the actual cut made by the flame.

**K** varies for various thicknesses of steel, as it is dependent upon

Fig. 4—Templets are normally divided into two classes—female (inside) or male (outside)—as shown in this illustration.



signer will allow use of the same templet on either type of machine, permitting "last-minute" rescheduling of work by the production department.

As shown in Fig. 4, templets normally can be divided into two classes, female (inside) or male (outside) templets, called so because the roller rolls along the outside contour of a male templet and within the inside edge of a female templet. Within each of these two classifications, two sub-divisions must be set up depending upon the type of workpiece to be cut, as each type of templet is capable of making either a male or female workpiece. From this it can be seen that four classes of templets, as illustrated in Figs. 5 and 6, may be designed of which each class must be calculated

the size and make of the cutting tip used.

The above formula confirms that statement that a templet made for a certain size of roller cannot be used successfully with a roller of a different diameter.

After the fundamentals are understood thoroughly by the designer, the next three questions to be considered are: (1) What is the best thickness of templet stock? (2) Should we standardize on a certain roller diameter and if so, what size should be selected? and (3) When do we use male templets and when are female ones preferred?

The answers to these questions cannot be made unqualified as cases vary too widely. However, the designer may be guided by several important facts. Templets have been found to give sat-

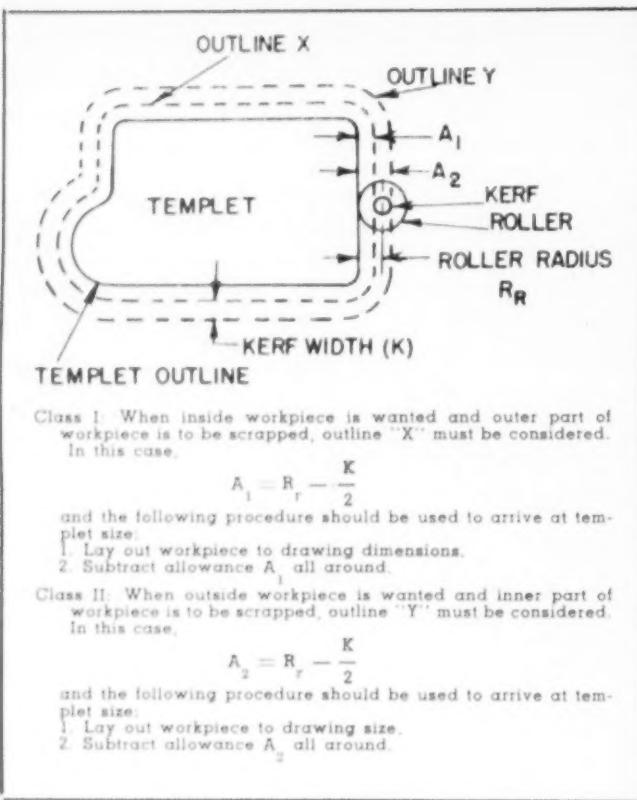


Fig. 5—Illustration of Class I and II templets: The male (outside) tempel.

Class I: When inside workpiece is wanted and outer part of workpiece is to be scrapped, outline "X" must be considered. In this case,

$$A_1 = R_r - \frac{K}{2}$$

and the following procedure should be used to arrive at tempel size:

- 1 Lay out workpiece to drawing dimensions.
- 2 Subtract allowance  $A_1$  all around.

Class II: When outside workpiece is wanted and inner part of workpiece is to be scrapped, outline "Y" must be considered. In this case,

$$A_2 = R_r - \frac{K}{2}$$

and the following procedure should be used to arrive at tempel size:

- 1 Lay out workpiece to drawing size.
- 2 Subtract allowance  $A_2$  all around.

isfactory performance if made of steel  $\frac{1}{8}$ -inch or thicker. If the flame cutting machine is well cared for, if it operates freely and is leveled accurately, a thin tempel will perform excellently, as it gives from 3 to 7 pounds traction, while a tempel as thick as  $\frac{1}{2}$ -inch reaches a pull of from 10 to 15 pounds. Obviously, tempel cost will be greatly reduced if thin stock is used in preference to thicker material and the designer owes his sense of economy a thorough investigation of the condition of the machines and, if necessary, experiment with various thicknesses to arrive at the answer.

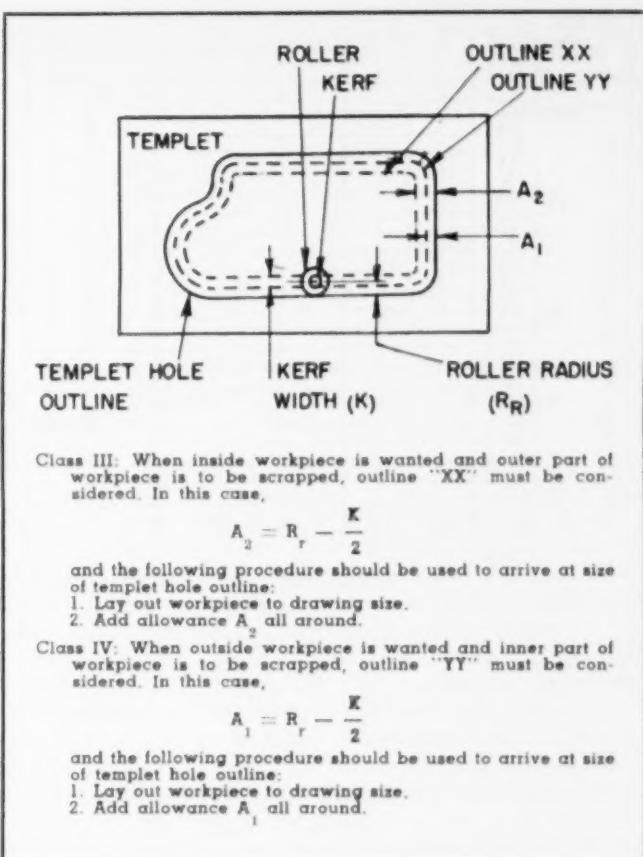
The question of tempel thickness is somewhat coupled with the determination of roller diameter since smaller rollers require heavier templets to procure the same amount of traction. The roller diameter, however, depends mainly upon the intricacy of the pattern to be cut as well as the cutting speed. As can be seen from the chart Fig. 7, the cutting speed varies inversely with the thickness of the

work and, if it is undesirable to change the speed range of the variable speed tracer motor, the roller should be of such diameter as to cover the speed range of the expected production work. Many users have standardized on  $\frac{1}{2}$ -inch diameter rollers and hesitate to change rollers for various jobs for simplicity's sake and to prevent costly errors. When new machines are purchased it is advantageous to inform the supplier of the intended roller diameter and cutting-speed range so that a variable speed motor of proper speed range will be furnished.

In choosing between male and female

Fig. 6—Illustration of Class III and IV templets: The female (inside) templet.

templets, the male templet should be given preference in almost all cases because: (a) The cost of a male templet is usually 30-50 per cent less than that of a comparable female templet since band saw blades do not have to be broken to cut inside contours and starting gates are not necessary for Class I male templets. Female templets require more material. The final finishing of male templets is simpler and faster. Also, mounting arrangements of the male templets are generally less costly; (b) Male templets can be "nested" quite simply at rather low design and building cost; (c) In operation, the tracing mechanism has to be raised or lowered in order to reach the inside contour of a female templet. This operation is time consuming and on some machines (mostly smaller ones and older types) even impossible thereby restricting the range of the torch and prohibiting the use of same for other tasks as for instance



the cutting of interfering parts of scrap plate which is often used for smaller pieces; and (d) The necessity of cutting sharp corners often determines the type of templet chosen even though points (a), (b) and (c) point out that the male templet is by far the more desirable one. It is impossible to achieve a sharp-corner-cut on an outside corner of a templet, while an inside corner will do that job satisfactorily except for the radius of the kerf (K).

In figure 8, the minimum radius

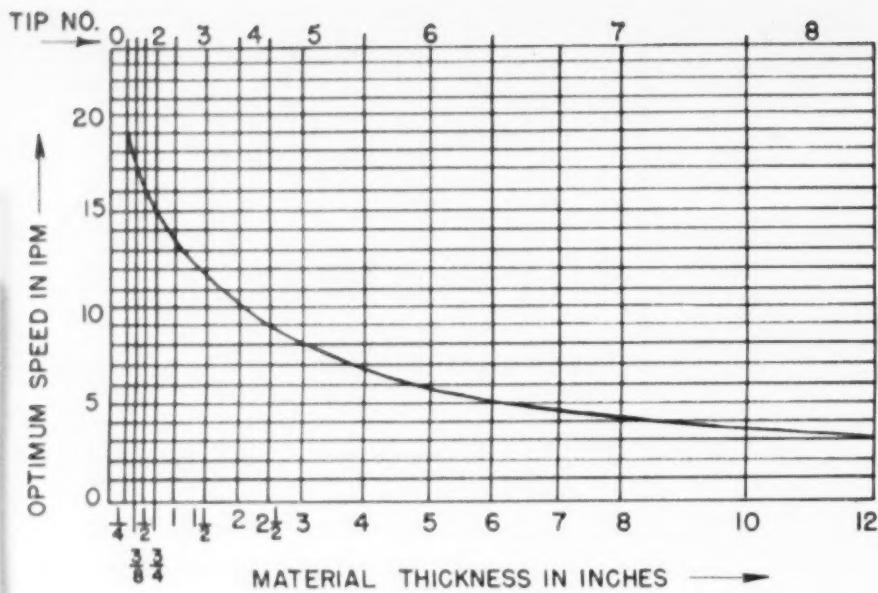


Fig. 7—Chart showing Optimum Speed plotted against Material Thickness.

obtainable will be;

$R_1$  (when inside of work piece is saved and outside is scrapped.  
See outline "X")

$R_2$  (when outside of work piece is

saved and inside is scraped. See outline "Y")

$R_1 = R_r - \frac{K}{2}$        $R_2 = R_r + \frac{K}{2}$   
As K varies in direct proportion with the thickness of the work piece and ranges from  $\frac{1}{16}$  in. to  $\frac{1}{8}$  in. (for smaller thickness of plate), we find that:

$R_1$  = from 7/32 in. to 5/32 in. and

$R_2$  = from 9/32 in. to 11/32 in.

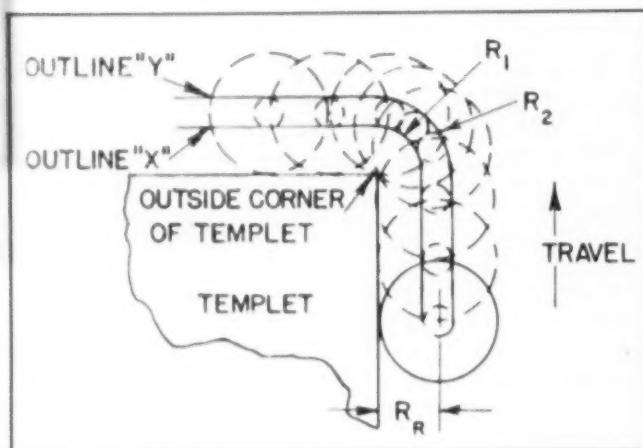
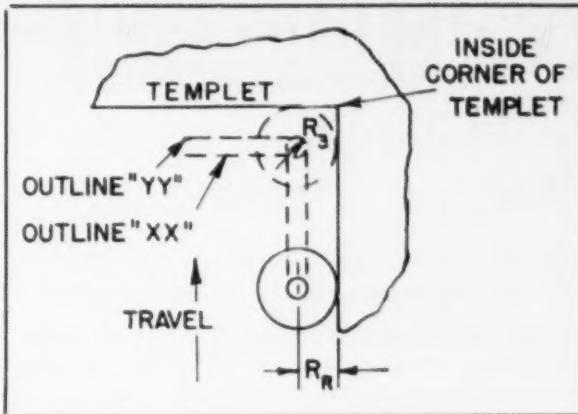


Fig. 8 — Illustration showing development for outside corner of templet.

Fig. 9—Illustration showing development for inside corner of templet.

( $R_r$  is assumed as  $\frac{1}{4}$  in. here as well as in any of the following calculations.) Utilizing an inside corner of a templet, however, a much sharper point may be obtained as illustrated in Fig. 9, where  $R_s = \frac{K}{2}$  ( $1/32$  in. to  $3/32$  in.) when outside workpiece is saved (Outline "YY"), which is sharp for almost all practical purposes and, theoretically, no radius at all is encountered when the inside piece is saved along outline "XX".

Care must be taken to prevent the roller from stopping as it reaches an inside corner of the templet as equal magnetic pull at two points prevents travel. There are four easy methods of dealing with this difficulty: (1) Reduce magnetic force at the "incoming" side of the corner by thinning templet at one point, as shown in Fig. 10, thereby allowing greater magnetic attraction of the "outgoing" side to pull the roller across the corner. Dis-



advantages: Roller travel limited to one direction, weakening of attraction sometimes causes tracing mechanism to stray from templet entirely, especially when machine is not leveled perfectly, and experience of a somewhat jerky motion out of the corner; (2) Increase thickness of templet at the "outgoing" side of corner, as shown in Fig. 10, by the addition of a small metal strip thru welding or screwing. Two of the disadvantages listed under point (1) above, still hold true. However, weakening of the magnetic at-

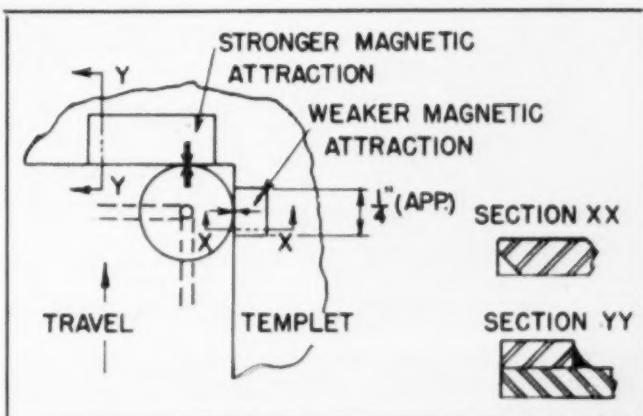


Fig. 10 — Illustration showing proper method of constructing inside corners of templets.

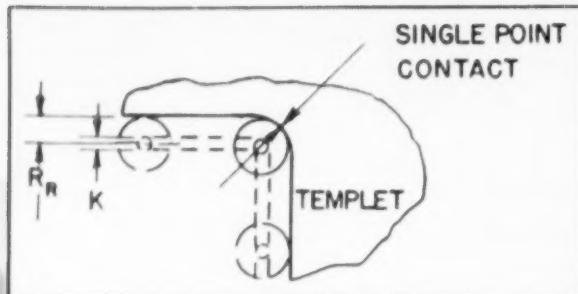


Fig. 11—Illustration showing the relationship between the inside corner templet radius to the roller radius.

traction has been eliminated; (3) Combine (1) and (2), especially where either method alone has failed. Now, in addition to the disadvantages listed under (1) another is added here, it being the increased cost of templet making; and (4) Replace sharp corner with a radius 1/32-in. larger than the roller radius, as shown in Fig. 11. This results in single-point contact, permitting the roller to travel undisturbed. This method has several advantages

over the methods previously mentioned, as it allows roller motion in both directions, maintains constant thickness of the templet material and insures smooth motion. However, due to the corner radius of the templet being somewhat larger than the radius of the roller, the workpiece will show a slight rounding of the corner, a condition acceptable in almost all cases.

Some flame cutting machines have provisions allowing the torch or torches to be moved slightly to one side or another, while the tracing mechanism remains stationary against the

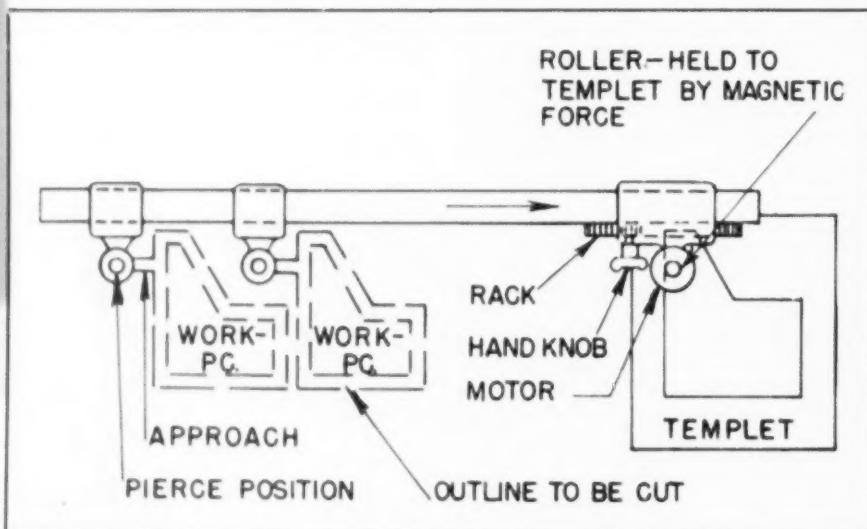
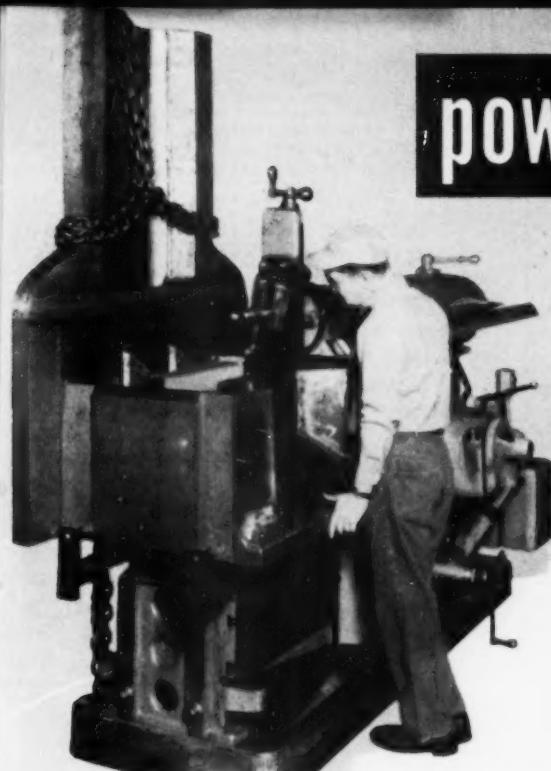


Fig. 12—Illustration of a tracer mechanism equipped with device which permits piercing of the work material and subsequent slow approach to the outline of the workpiece to be cut.

# powerful!



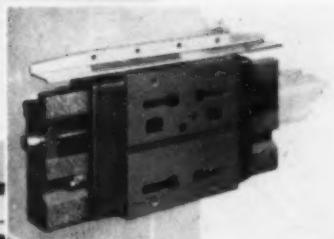
Jobs like this 5300\*  
weldment are easy on  
a Cincinnati

**Cincinnati Shapers are  
powerful and dependable...**

Cincinnati Shapers handle very heavy work—  
are powerful metal removers. They are  
dependable and trouble free on the most  
demanding jobs.

The extra long feed of the Cincinnati tool  
slide gives the needed range to shape the long,  
blind hole of this large weldment. Dovetailed  
tool slide and accurately gibbed ram, with  
extended bearings, prevent chatter under these  
severe conditions. Table feed and power  
rapid traverse operate smoothly even with  
this 5300-lb. load.

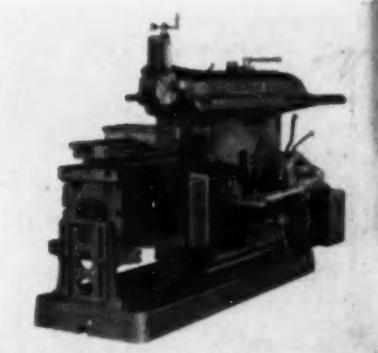
Cincinnati Shapers work to close limits and are  
profitable in both tool room and production  
departments.



This massive cross rail securely sup-  
ports the apron on three automatically  
lubricated bearing surfaces. All controls  
are at the operator's position. The cross  
rail is square-locked to the column and  
automatically lubricated. Alignment is  
maintained by taper gibs.



This sturdy table support has the  
sliding action at the table and is gibbed  
to maintain alignment. Sliding surfaces  
are completely protected against dirt.



**THE CINCINNATI SHAPER CO.**

Write for  
Catalog N-5

CINCINNATI 25, OHIO, U.S.A.

SHAPERS - SHEARS - BRAKES



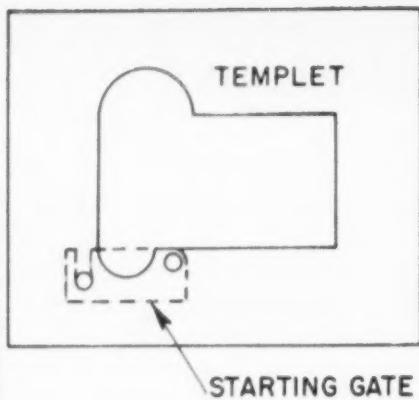


Fig. 13—Illustration showing method of providing a starting gate in female templets.

templet. As shown in Fig. 12, this is effected thru a hand knob operating a rack on the tracer and permits piercing of the steel plate and subsequent slow approach to the outline of the workpiece to be cut. When designing templets for machines lacking this feature, a starting gate, as shown in Fig. 13, must be incorporated in female templets by providing a recess with a removable cover, the latter being hinged, loosely doweled or otherwise endowed with some timesaving locating device.

The problems and solutions

shown in Fig. 14, 15, 16, illustrate the need for thorough consideration of the requirements before a decision is made regarding the type of templet to be used. As illustrated, these problems cover workpieces of almost identical design, yet basically different templets are required.

#### A Word of Warning

Don't be surprised if you find after you have taken all precautions and calculated allowances accurately, that your finished workpiece is too small. Most likely, expansion is to blame,

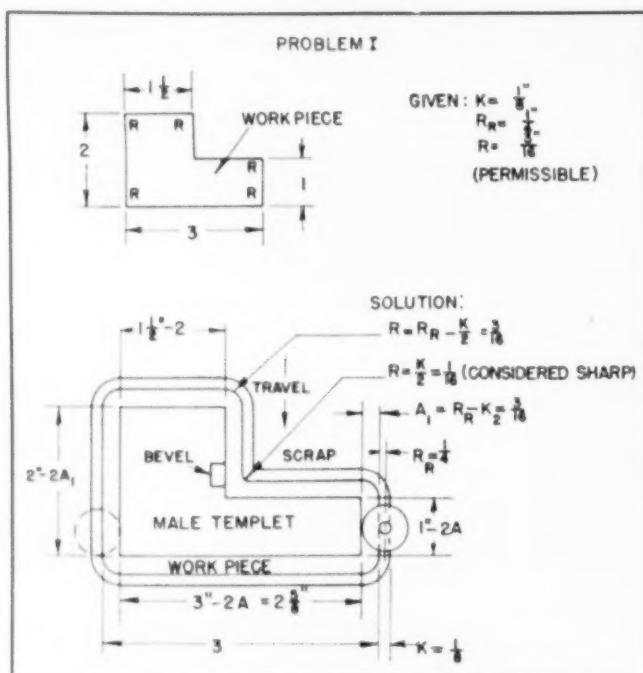


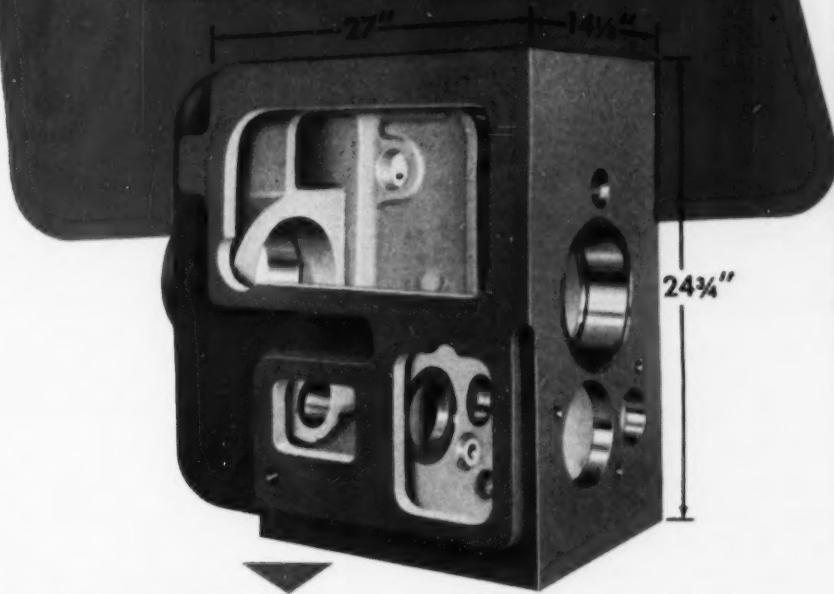
Fig. 14 — Illustration showing approach to the solution of a problem involving a male templet.

THE JIGMIL TECHNIQUE

# JIGLESS BORING

Possible on Small Lot Production

- FAST PRODUCTION AND HIGH ACCURACY
- FLEXIBILITY OF APPLICATION FOR SMALL LOT PRODUCTION
- SUBSTANTIAL REDUCTION OF TOOLING COSTS



This casting is processed in lots of 12 on a Model 38 Jigmil.  
"In Line" Bores are machined with simple Stub Boring Bars to  
Precise Limits of Alignment by Indexing Workpiece 180°.

Come to Detroit and Investigate  
the "Jigmil Technique"

Demonstrations at our Plant by Appointment

**DEVLIEG**  
**JIGMIL**

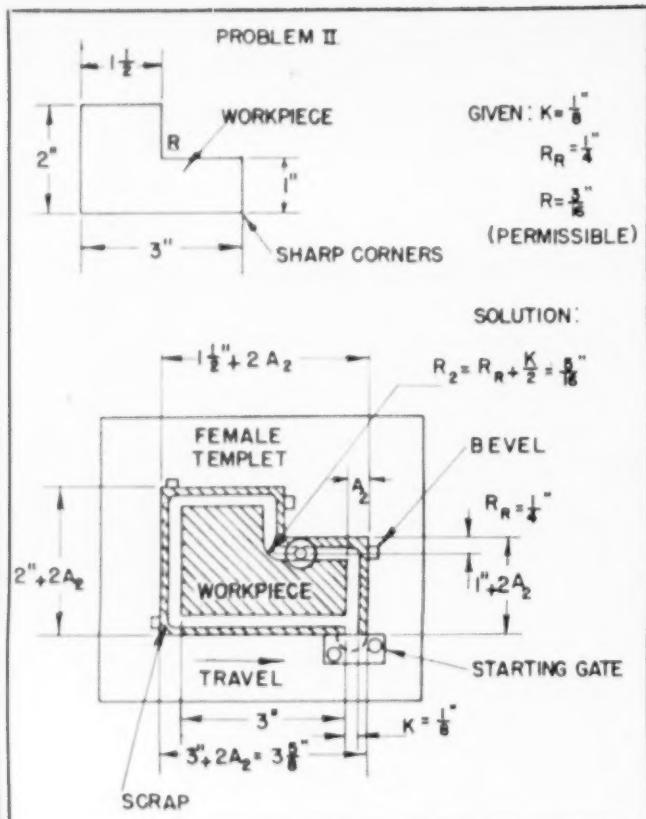


Fig. 15 — Illustration showing approach to the solution of a problem involving a female templet.

the material before and after cutting) and using 0.000006 for the coefficient of linear expansion for steel, employing a above formula, we get:  $96 \times 0.000006 \times 120 = 0.062$  in. It is rather difficult to estimate temperature differences and for this reason it will often be necessary to make templet corrections after the amount of error is actually measured. These cases do not arise too often as usually

rendering the work too short or too small after cooling, especially where long parts are involved. Nevertheless, even that can be taken into consideration by the designer, simply by using this formula: Reduction of length roughly equals original length times the coefficient of linear expansion for the particular material times the difference of temperatures. For instance, we experienced over  $\frac{1}{8}$  in. in length reduction after cutting some 96-in. long steel arms. Estimating a temperature difference of 120 degrees Fahrenheit (this is the difference of

an accuracy of plus or minus  $\frac{1}{16}$  in. in workpieces of great length is tolerated.

To enable the templet designer to use the proper allowances in order to achieve greatest possible accuracy, a chart should be compiled similar to the one shown in Fig. 17. The basic data is obtainable from the manufacturer of the cutting machine and, if arranged in a convenient manner, it will give the designer fingertip control of his calculations. It is important, however, to key this data to the type of flame cutting tip to be used for the parti-

# 4-Man Shop with a FUTURE



• This small shop houses a successful and growing business due to continuous high standards of accuracy.



Quality equipment pays the small operator as well as the large.

The Schoening Machine Service, 3284 Dunn Street, Cincinnati, Ohio—business, production machining—small in size—big in accomplishment—testifies to the value of fine tools.

The Cincinnati Bickford Super Service Upright Drill, illustrated, is drilling five  $\frac{1}{2}$ " holes and four  $\frac{1}{2}$ " holes to a plus or minus .005" tolerance in a steel cover  $\frac{1}{8}$ " thick—a production job.

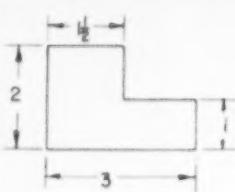
Mr. Schoening tells us he has held accuracy to a plus or minus .0002" on production reaming jobs.

Write for Bulletin No. U-25.



*Equal Efficiency of Every Unit  
Makes the Balanced Machine*

**THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.**

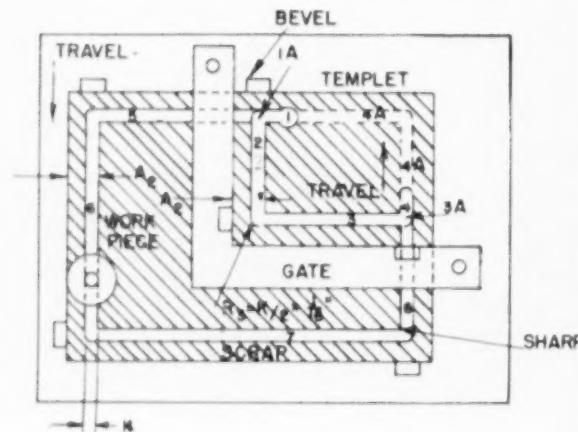


### PROBLEM III.

GIVEN:  $K = \frac{1}{8}$

$$R_R = \frac{1}{4}$$

NO RADIUS  
PERMISSIBLE



The solution to this problem is as follows: Since no radii are permissible and the workpiece has both inside and outside corners, a combination templet is called for.

A, and all templet dimensions can be calculated as in Problem II and are not shown here.

**Operation:** Pierce hole thru workpiece near (1). (No starting gate is needed.) Gate must be in place. Let roller advance along (2), (3) and (4). Stop flame near (4). Remove gate. Move roller to (1A). Light flame preheat (1A) and advance along (5), (6), (7) and (8). Work piece is completed when flame reaches (3A).

If the area between (1), (2), (3), (4) and (4A) is small, the flame does not have to be stopped at (4) during the first pass, but may be left to advance along (4A) until it reaches (1A). There the flame may have to be stopped or slowed in order to preheat start of new cut. (In this latter case, the gate must be removed while roller travels along (4A).)

cular job. It is advantageous to stamp the tip number onto the templet, not only to prevent guesswork by the operator, but also to assure use of the tip for which the allowance was calculated. Obviously, the allowances are

Fig. 16 — Illustration and explanation for the solution of a problem involving a combination templet.

different for different rollers and separate columns for each roller diameter must be provided. For the standards engineer in order to simplify standard time calculations, a graph as shown in Fig. 7 will come in handy, as the ideal cutting speeds for straight cutting are plotted against plate thicknesses.

The templet designer must also bear in mind the possibility of stack cutting. A great deal has been written for and against stack cutting, but it is self-evident that some jobs can be handled quite efficiently by stack-

ing, while others are not. Each case must be analyzed by standard time method or by actual timestudy and, if savings can be realized, stack cutting should certainly be tried. Usually, thinner plates (up to  $\frac{1}{2}$  in. thickness) are

# Precision ROD CUTTING

## at High Speed



with the New  
**DI-ACRO**  
**ROD PARTER**

The DI-ACRO Rod Parter further increases the range of "DIE-LESS DUPLICATING" as a real cost-cutting, time-saving production technique so well established by the DI-ACRO Bendors, Brakes and Shears.

**Do you require precision?**—The DI-ACRO Rod Parter holds tolerance to .001" on duplicated cuts. The ends are square, and roundness is maintained.

**Do you want speed?**—The Rod Parter exceeds output of other methods with equal accuracy, on rods and bars up to  $\frac{5}{8}$ ". Torrington Roller Bearings incorporated in an exclusive multiple leverage arrangement provide remarkable ease of operation.

### GET "DIE-LESS DUPLICATING" CATALOG!

Show parts produced without die expense or delay by DI-ACRO Bendors, Brakes, Shears, Rod Parters, Notchers, Punches. Send for your free copy.  
Pronounced "DIE-ACK-RO"

#### "PARTS OFF" MANY MATERIALS

All hot and cold rolled rods

Stainless steel

Chrome Molybdenum

Copper Brass

Aluminum Bi-metals

Many types of plastics

Fibre Rubber Wood



## O'NEIL-IRWIN mfg. co.

306 EIGHTH AVENUE, LAKE CITY, MINNESOTA

PLATE THICK- NESS	TIP NO.	KERF DEC.	KERF FRAC	$R_R = \frac{1}{4}$ "		$R_R = \frac{3}{8}$ "	
				ALLOWANCE $A_1 R_R + K_2$	ALLOWANCE $A_2 R_R + K_2$	ALLOWANCE $A_1 R_R - K_2$	ALLOWANCE $A_2 R_R - K_2$
$\frac{1}{4}$	0	.075	$\frac{3}{64}$	$\frac{7}{32}$	$\frac{9}{32}$	$\frac{11}{32}$	$\frac{13}{32}$
$\frac{3}{8}$	1	.095	$\frac{3}{32}$	$\frac{13}{64}$	$\frac{19}{64}$	$\frac{21}{64}$	$\frac{27}{64}$
$\frac{1}{2}$	1	.095	$\frac{3}{32}$	$\frac{13}{64}$	$\frac{19}{64}$	$\frac{21}{64}$	$\frac{27}{64}$
$\frac{3}{4}$	2	.110	$\frac{7}{64}$	$\frac{13}{64}$	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{7}{16}$
1	2	.110	$\frac{7}{64}$	$\frac{13}{64}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{7}{16}$
$1\frac{1}{2}$	3	.130	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{7}{16}$
2	3	.130	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{7}{16}$
$2\frac{1}{2}$	4	.145	$\frac{9}{64}$	$\frac{11}{64}$	$\frac{21}{64}$	$\frac{19}{64}$	$\frac{29}{64}$
3	5	.165	$\frac{11}{64}$	$\frac{11}{64}$	$\frac{21}{64}$	$\frac{19}{64}$	$\frac{29}{64}$
4	5	.165	$\frac{11}{64}$	$\frac{11}{64}$	$\frac{21}{64}$	$\frac{19}{64}$	$\frac{29}{64}$

stacked and clamped (or welded) together to form one thick plate, generally from 2 in. to 3 in. high which is then cut, giving a number of identical pieces.

If great accuracy is desired, the templet designed for single cutting will not operate correctly for stack cutting as can be seen from the following example: A disc, 5-in. in diameter is to be cut of  $\frac{1}{4}$  in. plate. From Fig. 17 the allowance for a male templet—assuming  $\frac{1}{2}$  in. diameter roller—is read as  $7/32$  in. (col.

Fig. 17—Chart compiled for use by templet designer showing the proper allowances to make in order to achieve the greatest possible accuracy.

5), making the templet  $4\frac{9}{16}$  in. in diameter. If this same templet is used for cutting a 3 in. thick stack, and a number 5 tip is selected, the actual workpiece will be only  $4\frac{29}{32}$  in. in diameter. (Templet

diameter  $4\frac{9}{16}$  in. plus twice allowance for 3 in. plate, which is  $11/64$  in. in col. 5). It is now clear that the design-

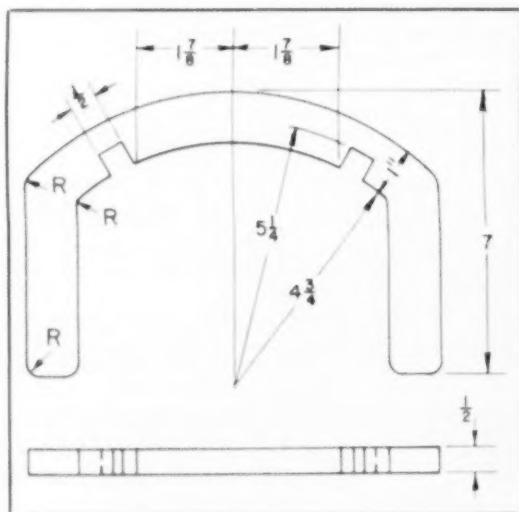
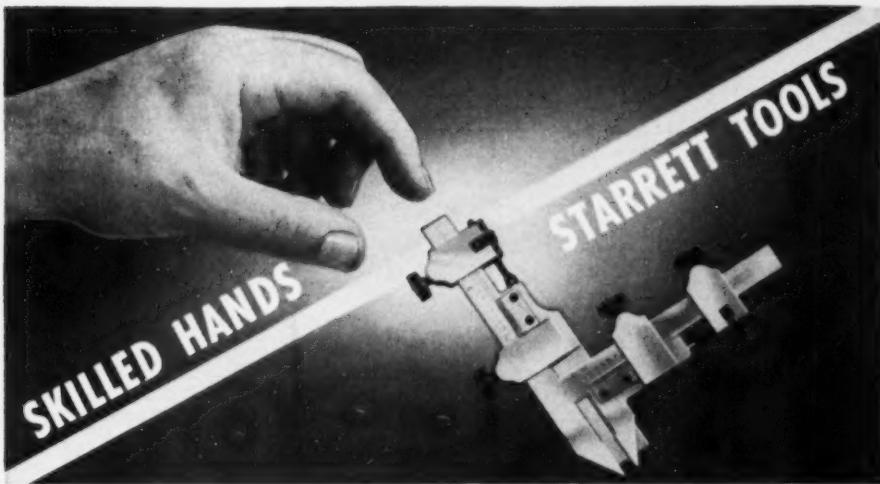


Fig. 18—The cost of producing the shape shown here was reduced 75 per cent by the application of the flame cutting speed.

# AN UNBEATABLE COMBINATION...

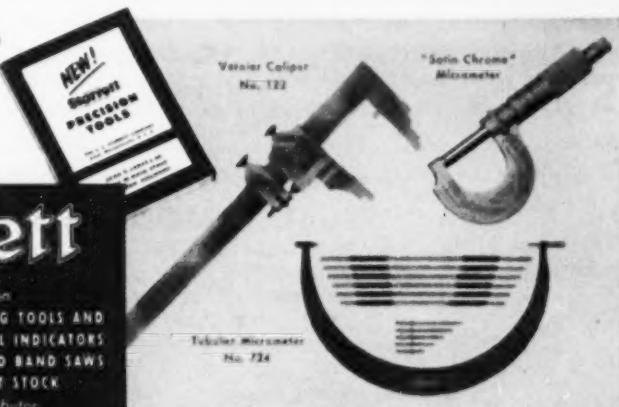


STARRETT Tools in the hands of skilled craftsmen make a combination that insures the highest order of accuracy and fine workmanship. Since 1880, STARRETT has pioneered in the development of precision measuring tools . . . now makes more than 3000 items that contribute to better,

faster, lower cost precision mass production. As the "World's Greatest Toolmakers", The L. S. Starrett Company continues to lead in the development of new and finer tools and to raise the standard of precision wherever men work with skill and accuracy.

## NEW TOOLS CATALOG

Describes and illustrates dozens of new and improved Starrett Tools. Send for your free copy. Ask for New Tools Booklet "M.D."



THE L. S. STARRETT CO., • *World's Greatest Toolmakers* • ATHOL, MASSACHUSETTS, U.S.A.

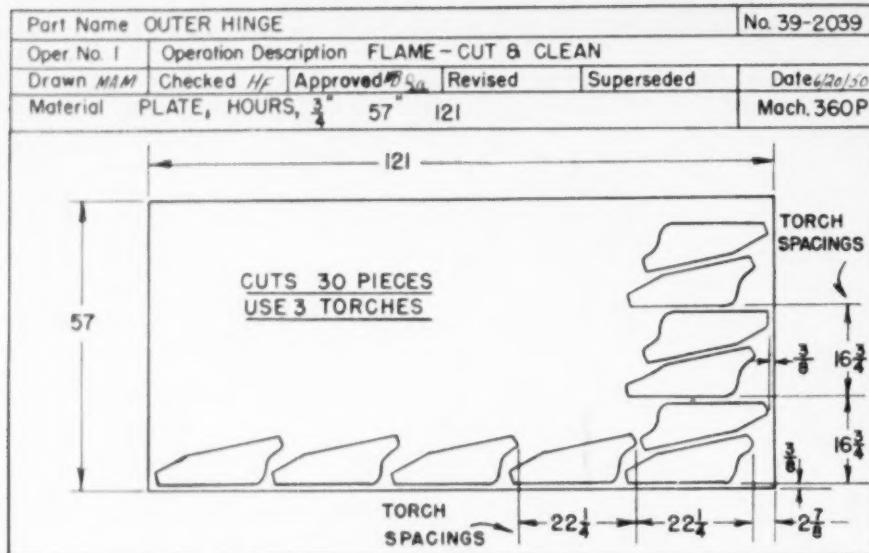


Fig. 19—After the most efficient nesting layout has been determined on the board, the chart shown here is compiled for use by the flame-cutting machine operator to enable him to make his setup with a minimum of time loss as well as to assure maximum yield per plate.

er must find out in advance if stack cutting is desired. Also, the templet should be marked to that effect to prevent costly errors.

Flame cutting often fills the gap between low and high production as the case points out: A flat piece, Fig. 18, with two sharp slots for indexing was previously purchased as a casting, the slots were machined by shaping, as

standard milling cutters would not reach and the production figures did not warrant expensive tooling. A heat treat operation was necessary to harden the inner surface for wear, as a detent was to slide along it. A suitable magnetic tracer templet proved to lower cost by 75 per cent even though the cut had to be interrupted twice. Selecting SAE 1045 steel plate,

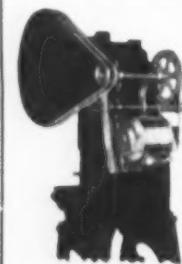
## Put the "PUNCH" in Punch Presses with a MODERN Motor Drive

No need to use slow speed or geared motors and small pulleys to slow down your presses.

Utilize standard 1750 RPM motors.

"V" Belt Drive absorbs shock. Operate smoothly, silently, efficiently, economically. Write to Dept. MS for complete details.

**MODERN MOTOR DRIVES DIV. of The Nichols Engr. Co.**  
Dept. MS, 3816 W. GRAND AVE. CHICAGO 51, ILL.



*proved in more than 10,000 shops...*

**KNURLED SOCKET HEAD CAP SCREWS  
AND STRIPPER BOLTS**

... faster, easier driving with firm finger grip on the knurled heads—spin in with hexagon wrench.

• GAGE MAKERS' SUPPLIES • DANLY TOOL, DIE AND GAGE MAKERS' SUPPLIES

**PRECISION DOWEL PINS**

... specially hardened (58-60 Rockwell C) to resist upsetting—easier to drive with tapered leading ends to "pilot" the pin into the hole.

• GAGE MAKERS' SUPPLIES • DANLY TOOL, DIE AND GAGE MAKERS' SUPPLIES • DANLY TOOL, DIE AND GAGE MAKERS' SUPPLIES

**DANLY TOOL, DIE AND GAGE  
MAKERS' SUPPLIES**

assure tool and die makers of standard part quality fully consistent with good tool making practice. The Danly line includes many items in addition to those shown here such as set screws, bushings, toggle clamps and laps. A nation wide system of completely stocked Danly branches\* assures quick, convenient delivery.

**DANLY MACHINE SPECIALTIES, INC.**

2100 South Laramie Avenue  
Chicago 30, Illinois

• GAGE MAKERS' SUPPLIES • DANLY TOOL, DIE AND GAGE MAKERS' SUPPLIES • DANLY TOOL, DIE AND GAGE MAKERS' SUPPLIES

**JOB TAILEDOR DIE SPRINGS**

... two complete size ranges, for medium pressure and high deflection or high pressure and medium deflection—precision coiled and ground square for full end bearing.



PRECISION DIE SETS • STANDARD AND SPECIAL

**BUILD BETTER DIES WITH**

**DANLY**

**TOOL DIE AND GAGE MAKER'S SUPPLIES**

**\* WHICH DANLY BRANCH  
IS CLOSEST TO YOU?**

- Chicago 30, Illinois (Central Airport)
- Appleton 14, 1210 East 33rd Street
- Dayton 2, 1718 East Main Street (Branch)
- Danbury 14, 1245 Temple Avenue
- Grand Rapids 12, 120 Monroe Street, Michigan
- Hannibal 4, Missouri 3, West Main Street
- Long Island City 1, 47-49 Steinway Street
- Los Angeles 24, Durfee-McGill & Supply Co., 4490 South Alameda
- Minneapolis 2, 1111 East Winona Avenue
- Philadelphia 44, 19 West Chestnut Avenue
- Providence 4, 16 Commercial Street
- Toronto 2200 Yonge Street

**COMPARATIVE NESTING CALCULATION**

PART NAME:	SUPPORT	ACTUAL WT./PC. 107 LBS.
PART NO.:	39-3109	STEEL PRICE 3.5 /100 LBS.
USED ON MODELS:	XAW	SCRAP VALUE 23.62/2000LBS.
PLATE THICKNESS & MAT'L.	$\frac{1}{2}$ HR.	DATE 6-13-1950

PRESENT NESTING	PROPOSED NESTING
PLATE SIZE	$44\frac{1}{2} \times 132$
WEIGHT OF PLATE	2485
COST OF PLATE	87.50
NO. PCS. CUT/PLATE	11
ACTUAL WT. OF ALL PCS. CUT	1177
SCRAP WEIGHT	1308
SCRAP VALUE	15.45
NET COST ALL PCS. CUT	72.05
NET COST 1 PIECE	6.55
NET SAVINGS / MACH.	.68
NET SAVINGS / YEAR <sup>190</sup> MACH.	129.20
REMARKS	

Fig. 20—A chart of the type shown here may be utilized in calculating actual material savings due to improved nesting. The figures in row labeled "No. pcs. cut/plate" are determined by layouts on drafting board made by use of cardboard "models." Scrap plays an important part and its salvage value must be considered in the final analysis.

an automatic hardening operation took place as the flame heated the edge. The only requirement was a small stream of water to act as a quench. After some experimenting it was found that even the water hose could be eliminated as sufficient hardness was reached by dropping the work

into a bucket of water after it was completely cut.

We have found flame cutting to be a great asset to our fabricating department, especially for jobs which are "in-between", not high production, yet efficient tooling had to be provided to keep costs down and the product with-



**COLD RIVETERS**  
and AUTOMATIC STAKING MACHINES

This cold riveter (at left) is made in ten sizes to handle work from  $1\frac{1}{16}$ " to 2" diameter. Write for complete information.

For staking, riveting, eyeletting, burring, etc., this high speed staking machine (at right) will produce over 1000 pieces per hour. Adjustable hammer blow, easily and safely operated. Send Samples for Demonstration Purposes.

**HIGH SPEED HAMMER CO., INC.**  
307 NORTH ST. ROCHESTER 5, N. Y.



# MORE HOLES PER HOUR — PER DOLLAR

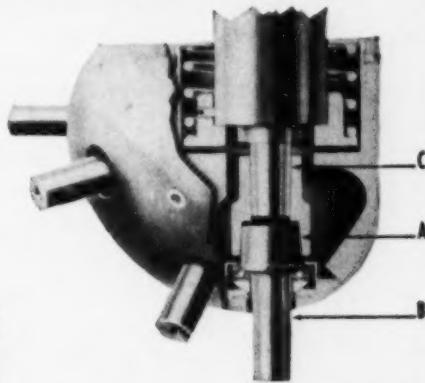
Increase production of any standard drilling machine by adding a Lign-o-matic, the *only* drill turret with the patented, self-centering principle that guarantees sustained accuracy equal to the drilling machine itself.

## FOR ALL CONSECUTIVE DRILL PRESS OPERATIONS

### PROVED PRODUCTION INCREASE

— Turret indexes faster than tools can be changed or work moved to another spindle. A single Lign-o-matic will release 5 drilling machines for other work and still show increased production and reduced costs on original job.

**VERSATILITY**—Fits any standard drilling machine without altering the machine. Handles operations such as drilling, reaming, counterboring, and tapping (on reversible spindle machines), up to  $\frac{1}{2}$ " diameter in any material.



**PRECISION**—Patented, self-centering tapered drive (A) automatically locks turret spindle (B) into exact alignment with drilling machine spindle (C) for sustained accuracy.

**GUARANTEE**—May be returned in 10 days for any reason for full refund of purchase price. Two-year guarantee against defective parts.

**PRICE**—Model D, 6 spindles with No. 2 Jacobs male taper ..... \$235.00  
Chucks extra at established prices.

**DELIVERY**—Currently, 2 weeks.



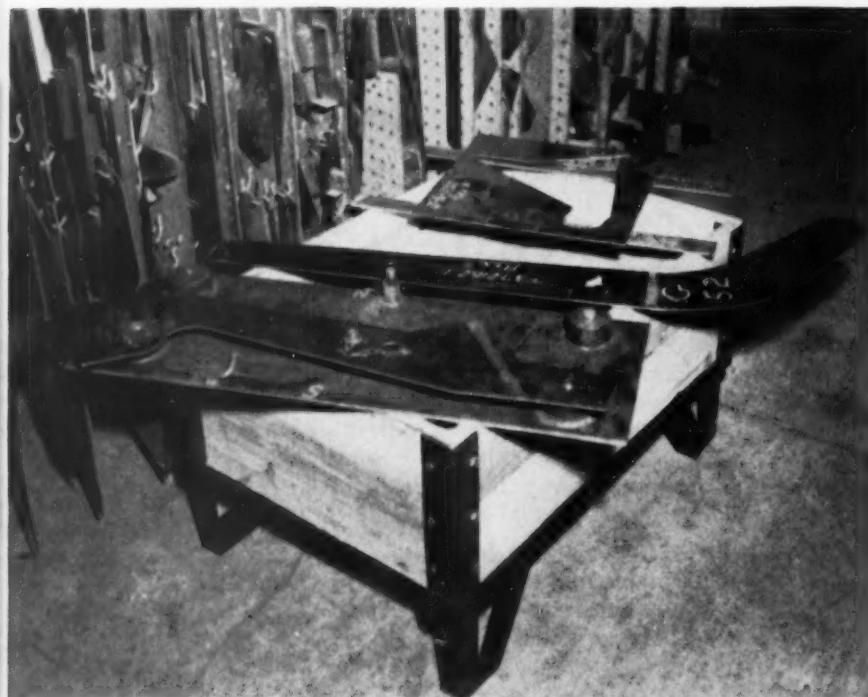
- Please rush ..... Lign-o-matic turrets for  
(drill press make) ..... (size)  
(quill dia.) ..... (spindle taper)  
My name .....  
Title .....  
 Please send literature on Lign-o-matic turret.  
(Attach coupon to company letterhead)

**HOWE & FANT, INC.**  
527 FLAXHILL RD., SO. NORWALK, CONN.

in competitive range. We are making parts weighing from a fraction of an ounce to half a ton on the same machine, utilizing the same types of templets. It should be realized however, that much money can be lost if mater-

many hundreds of flame cut jobs) we reviewed several other parts and soon the estimated savings reached a staggering total.

Realizing the importance of these "nesting lay-outs" we are now making



Several large magnetic tracer templets are shown on box with templet storage racks in background. The male templet in the foreground is mounted on base with dowels. After initial work-piece is cut, templet will be reversed onto rear dowels for automatic "nesting." Templets shown are made of 3/16-inch thick hot-rolled steel.

ial waste is not kept in check. In one instance we tried to improve the material efficiency and started to lay out several "nestings" on the drawing board. To our great surprise we found that we could save \$1450.00 per year by changing the size of one of our stock plates just slightly.Flushed by this success (which covered just one of

up separate sheets, as shown in Fig. 19, for each part showing plate size to be purchased, number of pieces per plate, proper nesting lay-out to enable the operator to obtain the correct number of pieces, as well as torch spacing for multiple-torch cutting. In order to obtain the greatest possible material efficiency, we calculate sav-



## ...because Cimcool does a BETTER job

"It's one of the biggest working improvements in years!" That's what machine operators everywhere say about Cimcool®, the radically new and different cutting fluid.

Naturally operators like their jobs better when they work with Cimcool. It doesn't soil hands or clothing. Can't smoke. Can't burn. And virtually eliminates rancidity and foul odors.

Cimcool is a *chemical emulsion*. It replaces all water emulsions and all but a few highly compounded specialty oils. Jobs are completed faster—better—because Cimcool combines friction reduction and cooling capacity in a degree never attained by old-fashioned cutting fluids. It cools so fast that tools and chips actually stay cool to the touch.

We sincerely believe one week's run will convince you. For a demonstration in one of your own machines, just write us and we'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Or, if you prefer, send for our free booklet "Cimcool Gives The Answers." Address, Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

\*Trade Mark Reg. U. S. Pat. Off.

A Production-Proved  
Product of  
THE CINCINNATI MILLING  
MACHINE CO.



for

OF ALL METAL CUTTING JOBS

85%



**PRESS-RITE**

**5 TON  
POWER PRESS  
STILL LEADER  
OF ITS CLASS!**



**ONLY  
\$187.50**

**F.O.B. St. Paul,**

**Standard  
Equipment**

**MODEL O  
Bench Model**

**NOT JUST ANOTHER  
5 TON PRESS**

... but a 5 ton press loaded with heavy press features. See it! You'll see why it remains the leader of its class for just \$187.50.

**WRITE TODAY FOR DETAILS!**

**Sales Service Machine Tool Co.**  
3303 UNIVERSITY AVENUE  
ST. PAUL 4, MINNESOTA

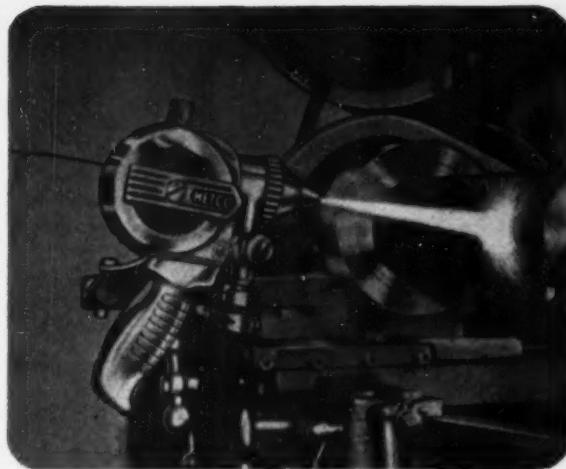


Two small female and three male templets are shown here. The circular templet is used for cutting back plates of turret lathe fixtures and includes three slots at 120 degrees for fastening such fixtures to turret lathe face plates.

ings for various nestings, as shown in Fig. 20. The most efficient method is then adapted.

Flame cutting can do a great deal for all of us. But we must use our imagination and we must not grow tired of experimenting.

For further information  
on any product men-  
tioned in this issue—use  
the READER SERVICE  
CARD between the  
covers.



# now a really low-cost metallizing installation... with the new Metco L-Gun



Metalлизing damaged journals on turbine shaft



Building up worn brake-drum



Metalлизing protective coating on steel plate

New, low, compressed-air requirements . . . only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor . . . bring metallizing within reach of the small user.

Here's a chance for the smaller maintenance shop to get into profitable metallizing operations like these:

- Save up to 90% of replacement costs on machine repair jobs.
- Do your own hard-facing.
- Apply long-wearing corrosion-resistant coatings to exterior plant structures, tanks and other equipment.

**Sprays 23 Different Metallizing Wires**—With the new L-Gun you can spray 10, .25, .80 carbon steels, stainless; babbitts, brass, bronze; nickel, aluminum, tin, zinc; special hard-facing materials such as Metco-Weld H, and the new self-bonding Sprabond wire.

**It's Versatile**—Use the L-Gun machine-mounted or hand-held—it weighs only 4 lb. 2 oz. Do all kinds of metallizing work—shaft and bore build-up with harder, longer wearing metals; build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.

**Same High Quality as Other Metco Guns**—The low air requirements of the new L-Gun have been achieved without any

sacrifice in Metco quality. It embodies new developments in turbine and nozzle construction—it is built, like all Metco guns, for rugged, dependable service.

#### A Real Opportunity for the Smaller Shop—

Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users—large and small.)

**Free Bulletin or Shop Demonstration**—Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course.



R. J. McWaters	Metallizing Engineering Co., Inc.
38-17 30th St., Long Island City 1, New York	
<input type="checkbox"/> Please send me L-Gun Bulletin 55:	
<input type="checkbox"/> Arrange a free demonstration in my shop:	

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

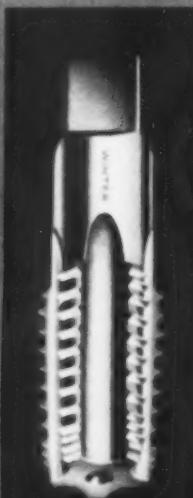
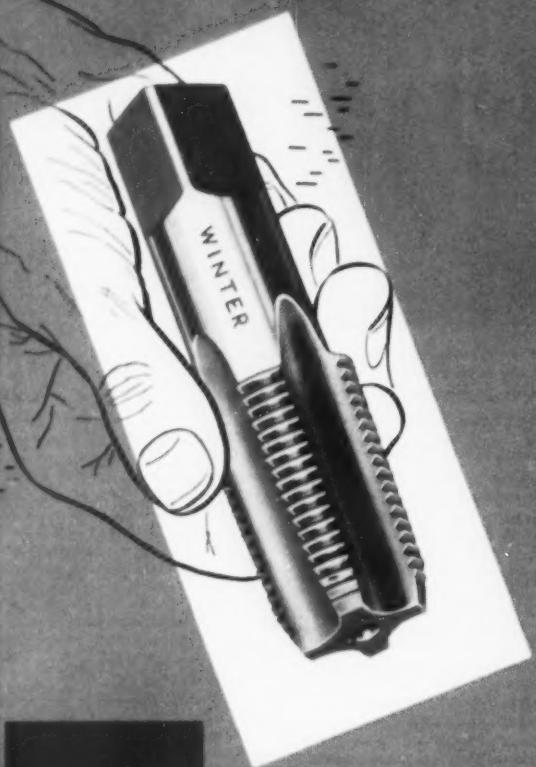
CITY \_\_\_\_\_ STATE \_\_\_\_\_

The following names are the property of Metallizing Engineering Co., Inc.  
METCOT • Sprabond wire • Metco-Weld

REG. U. S. PAT. OFF.

**METALLIZING ENGINEERING CO., INC.**  
38-17 30TH STREET

# HIGH PRODUCTION with WINTER PIPE TAPS



Leak-proof pipe joints on a production basis in all types of metals require pipe taps that combine precision with high performance.

Winter "Balanced Action" Pipe Taps are the result of study and long experience in this field. Regular styles, Interrupted Thread, and Dry Seal styles are all available.

Special Pipe Taps for stainless steel and other difficult materials, as well as taps for unusual applications, are designed to your requirements by experienced Winter Tap Engineers.

Winter also makes and stocks Head, Machine Screw, Chip Driver, Pulley, and Nut Taps, and many other types and sizes of threading tools.



## ALWAYS AT YOUR SERVICE

YOUR LOCAL DISTRIBUTOR carries a complete stock of WINTER Taps on his shelves—so close to your tapping problems on the telephone on your desk.

WINTER

WINTER BROTHERS COMPANY • Division of the National  
Twist Drill and Tool Company, Battle Creek, Michigan, U. S. A. Distributors in  
Principal Cities • Branches in New York, Detroit, Chicago, San Francisco

# ACCURACY and LONG TOOL LIFE with NATIONAL HOBS

For continuous cutting of gear teeth, splines, and other symmetrical projections, the hobbing process is recognized as a most efficient method. However, both work accuracy and hob life depend on the quality and precision of the hob itself.

National Hobs have the inbuilt qualities born of sound engineering, exact processing, and long field experience. Furthermore, National hob specialists are always ready to assist you on new or troublesome jobs.

Other National products are Twist Drills, Reamers, Counterbores, Milling Cutters, End Mills, and Special Tools.



"**CALL YOUR DISTRIBUTOR**"—It is NATIONAL'S firm belief, based on long experience, that the local industrial distributor is the one best source for all staple industrial needs—including NATIONAL Metal Cutting Tools.



# National

NATIONAL TWIST DRILL AND TOOL COMPANY •  
Rochester, Michigan, U. S. A. Distributors in Principal Cities  
Factory Branches: New York • Chicago • Detroit • Cleveland • San Francisco

WHATEVER YOU FASTEN . . .

COMPOSITION  
TO  
COMPOSITION

FABRIC  
TO  
FABRIC

WOOD  
TO  
WOOD

METAL  
TO  
METAL

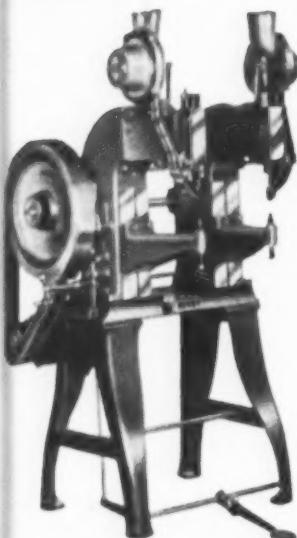
LEATHER  
TO  
LEATHER

OR ANY COMBINATION OF THESE MATERIALS . . .

*Chicago* AUTOMATIC RIVETING

FASTENS IT RIGHT . . . AND FASTENS IT FAST

In Chicago Automatic Rivet Setters from 1 to 4 tubular or split rivets are fed, inserted and clinched in a fraction of a second with each operating pedal release. Adjustment on some models permits handling different sizes of rivets. Riveting machine also adaptable for eyelets, grommets or drive screws.



#### **FREE Fastening Analysis**

Your output may be increased and cost reduced if you investigate. Send sample assembly and blue print.

*Chicago Rivet*

**CHICAGO RIVET & MACHINE CO.**

9621 W. Jackson Blvd., Bellwood, Ill. (CHICAGO SUBURB)

TUBULAR AND SPLIT RIVETS IN ALL RIVET METALS



**STOP "GUESS-GAGING"!**

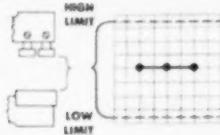
## USE FEDERAL INDICATING GAGES AT PRODUCTION

If your machine operators wear that "guess-gaging" look, it's time to take a new look at your dimensional control gages. Old-type gages don't give your men a fair break. Ordinary snap gages, for instance, can't possibly warn machine operators when their machines are about to produce scrap. On the other hand, Federal Indicating Gages give your men the complete dimensional control they need to **prevent scrap**.



### "GUESS-GAGING"

Checking parts coming off the machine with a "go, no-go" gage, the operator has to guess on borderline cases—that's to be expected with this type of gage. He simply knows each part measures within tolerances. No indication is given of tool wear, machine adjustment changes, or other conditions which will cause scrap.

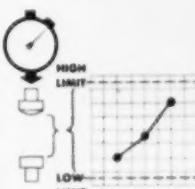


If the operator finds too many parts are over or under size, he resets his machine or regrinds his tools, bringing production back within tolerances. But the damage has been done. The operator has produced scrap because he was penalized by "guess-gaging" dimensional control equipment.



### INDICATING GAGING

When you put a Federal Indicating Gage in the hands of this same operator, he doesn't guess-gage because he *sees* exactly what each workpiece measures. In this case he sees a *trend*.



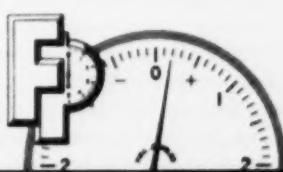
Obviously something definite is happening, because the Indicating Gage shows the diameter is steadily becoming larger. Something has to be done about it. The operator makes his machine and tool adjustments now... before it's too late... before scrap is produced.

There's no guess-work about it with the Federal Indicating Gage. The operator knows his production is right—he can see it clearly on the Dial, beyond the shadow of a doubt.

Federal has pioneered in the development, design, and manufacture of Indicating Gages of all types—mechanical, electrical, electronic, and air. If you are modernizing your dimensional control equipment, be sure to consult Federal. No obligation. **FEDERAL PRODUCTS CORPORATION**, 1412 Eddy Street, Providence 1, R. I.

# FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing all types of DIMENSIONAL INDICATING GAGES





By FRANK CHARITY

**Production change-overs are minimized and a high level of productivity is attained with the equipment.**

THROUGH the extensive and effective use of universal tools, the cost of production changeovers has been minimized and a high level of productivity has been attained in Bendix Aviation Corporation's plant 2 at North Hollywood, California. This particular plant produces Bendix automotive and farm-tractor hydraulic equipment. At this writing, such production daily includes the manufacture of 1000

master cylinders for Ford and Mercury cars and about 6000 precision assemblies for an average of nine entirely-different hydraulic components for tractors.

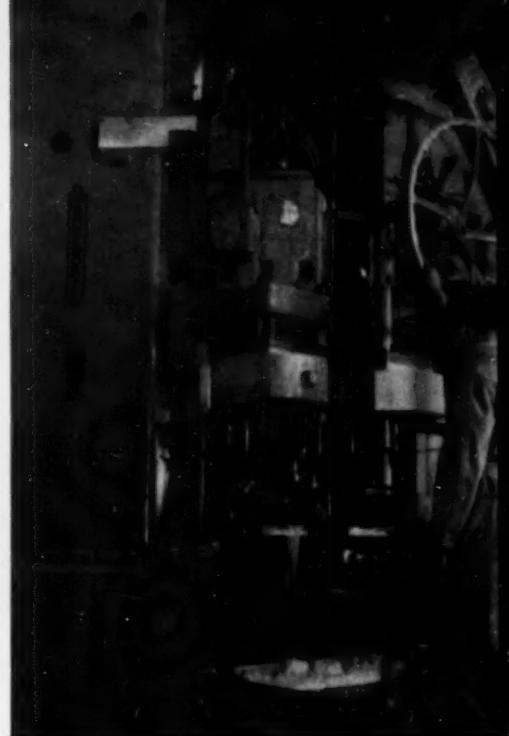
The continuous production of master cylinders permits the use of typical automotive methods. For example, a large Greenlee is being used to perform 34 operations on the cast iron bodies. This double-end, horizontal-

The Barnes four-station drilling machine shown in this illustration is utilized for heavy drilling and tapping operations in the Bendix North Hollywood Plant.

way machine has six stations and three parts are clamped in different positions at each station. One station is used for loading during the machining cycle and 34 cutting tools at the other five stations perform the complex drilling, tapping, boring, forming, reaming, recessing, and chamfering operations at a gross production rate of 140 parts per hour.

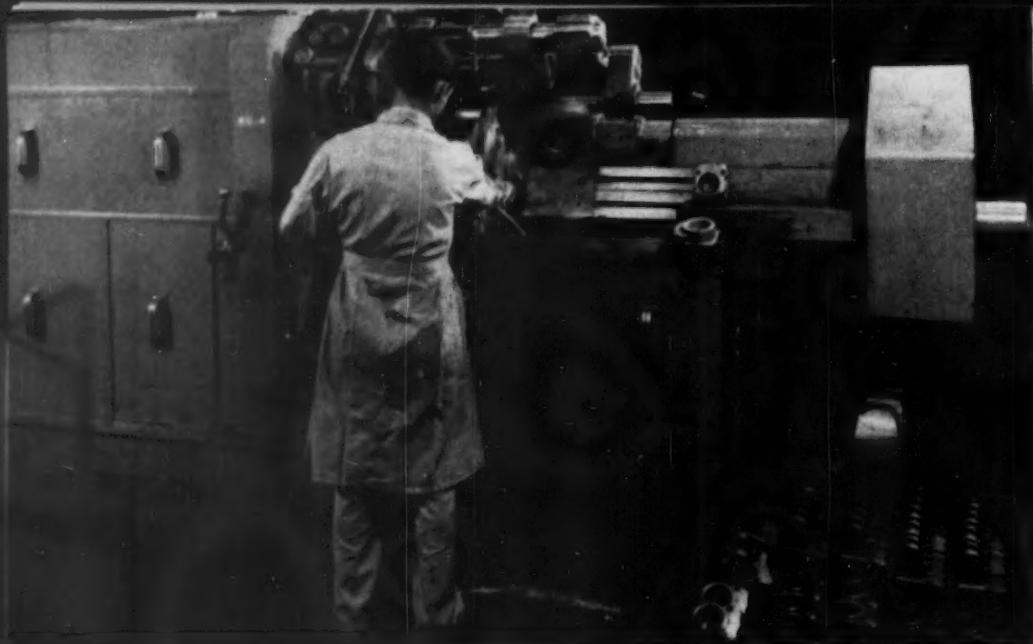
In the production of parts for tractor assemblies, castings for valve bodies, cylinders, cylinder heads, and so on, are machined in 1000 to 3000 lots; and approximately 30 different parts respectively require milling, chucking, drilling, broaching, and honing operations. This work is being done with remarkable efficiency, despite the need for frequent change-overs, through the use of: (1) proved, and therefore fixed, product designs; (2) standardized details in product designs and tools; (3) flexible machine tools; (4) universal tooling; (5) work schedules which involve the most practical sequence of operations in each circumstance for minimum down time.

In drilling and tapping operations, for instance, Barnes' four-station power-indexing drilling and tapping machines are being used in place of single-purpose equipment because the quantities required for individual production runs permit costs to be minimized by multi-spindle progressive work. One station is for loading; the next two stations are for drilling, reaming, and so on, and the fourth station is primarily reserved for tapping.



Two identical machines are used in this work, so that any job can be run on either machine thus allowing more flexibility for production control in machine loading for fewer setups, and preventing lost time due to breakdowns.

Hole patterns for multiple drilling normally involve the use of fixed-spindle drill heads for high production and adjustable-spindle drill heads for small-scale production, but neither of these methods was completely satisfactory for the subject operations, since the use of fixed spindles would have been too costly, and adjustable spindles would have provided setting difficulties (especially in the use of large drills). However, fixed-spindle drill heads have been satisfactorily adapted to Bendix work by laying out



This illustration shows a six-spindle New Britain chucking machine which is designed for facing, turning, forming and multi-hole drilling up to 90 cylinder heads per hour.

enough properly-placed spindles to permit alterations for different jobs simply by inserting proper tools in selected spindles; and adjustable spindles are now being used only for special jobs with hole patterns and production requirements that do not merit tooling variations in fixed-spindle equipment.

Universality is gained in the use of drill fixtures by designing basic fix-

tures and clamping members so that (by the use of adapters and different bushing plates) a variety of parts can be economically accommodated, and by fully utilizing the capacity of the machine with multiple fixtures at each work station. In some cases as many as four different parts are drilled simultaneously in order to gain the advantage of lower production costs without added tooling expenditures.

**STOP Oily Floor Mishaps with FULLER'S EARTH**

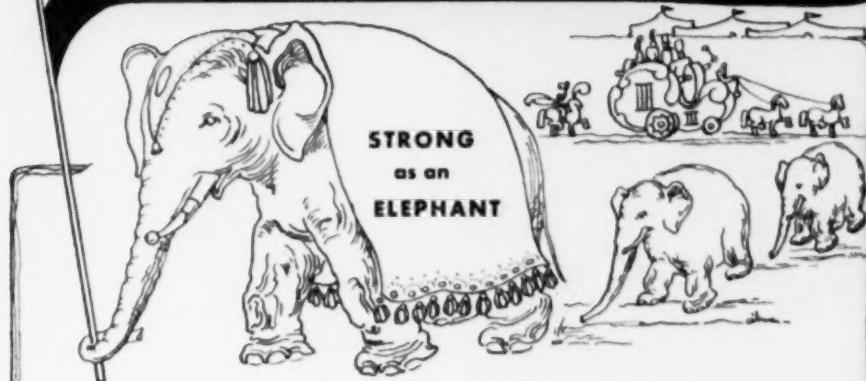


Avoid costly accidents caused by slipping on oily or greasy floors! Reduce fire hazards! Replace sawdust or wood shavings with Fuller's Earth. Every shop needs this low priced safety aid. Fuller's Earth absorbs oil and grease—and it's non-inflammable. Write for FREE SAMPLE to test.

TAMMS Dept. RM-9, TAMMS INDUSTRIES, Inc., 228 N. LaSalle Street, Chicago 1

JOIN THE PARADE  
OF PROFIT-THROUGH-OPERATION-ECONOMIES

PORTELVATOR® PACES THE PROCESSION



(PORTELVATOR®—THE HANDY HAMILTON PORTABLE ELEVATING TABLE)

If you owned an elephant . . . and had it trained to do your bidding . . . and gave it **plenty** of room to maneuver . . . it could **probably** do what Portelvator does . . . but it would have to be fed——So . . . for **your** lifting and transporting jobs . . . use Portelvator . . . for Portelvator is as strong as an elephant . . . as tough as an elephant . . . can lift like an elephant . . . has four point support like an elephant . . . no more tips nor slips than an elephant . . . costs less than an elephant . . . and **doesn't eat**.

LEARN THE PENNY PINCHING PARTICULARS . . .

WRITE FOR BULLETIN P-50  
SPECIAL



A Handy Hamilton Elevating Table, especially designed and built for your particular application will "cost" you nothing, for it will pay for itself in savings. Case histories show, "production increased 45%—overhead reduced 30%"—" \$2250.00 table paid for itself in 4 months"—"paid for itself in 45 days—now have nine, purchased one at a time out of savings effected."



THE  
*Hamilton*  
TOOL COMPANY

828 SO. NINTH STREET • HAMILTON • OHIO • U • S • A



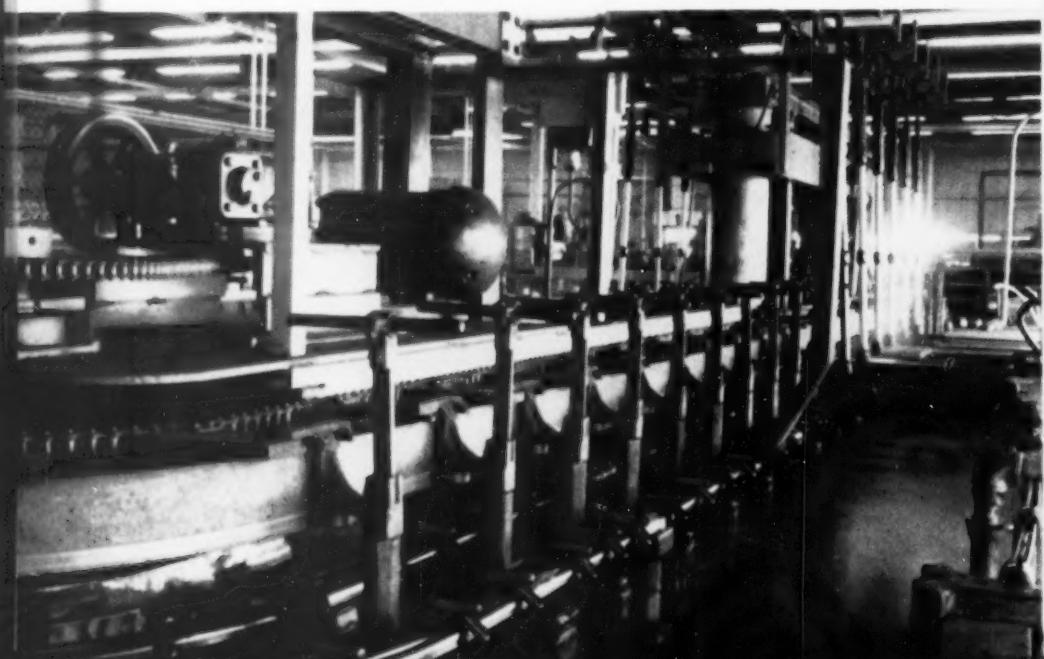
Bendix slide valve bodies are honed to 0.0003-inch tolerances in the Micromatic honing machine shown here.

and cradle-type fixtures can handle a number of different parts by changing inserted adapters, work with two New Britain 695 chucking machines has been greatly accelerated. Where the operation of machines requires a variety of attachments for different production runs, down time for change-overs is usually reduced by sequencing the work so that each attachment will get maximum utilization before it is removed.

In some circumstances the goal of maximum production is compromised to reduce setting-up time and to permit a more extensive use of fixtures, attachments, and cutting tools for different parts. For example, when the spindle in a universal drill head can-

Similarly, where castings are designed so that the same chuck jaws

Piston rods are hard-chrome plated in the Crown automatic unit shown here.



# SPECIFY LINDBERG AIR CYLINDERS



for

PULLING  
PUSHING  
LIFTING  
FORCING  
CLAMPING  
PRESSING

## No costly mechanisms needed!

Lindberg Double Acting Air Cylinders are proving their adaptability and worth in a wide variety of industrial uses. These simple, dependable, efficient and versatile cylinders are effecting considerable savings throughout industry by the reduction or complete elimination of costly mechanisms involving cams, gear drives and complicated set-ups.

Don't forget—with slight modifica-

tions, any size or model of Lindberg Air Cylinder may be used for low pressure hydraulic applications.

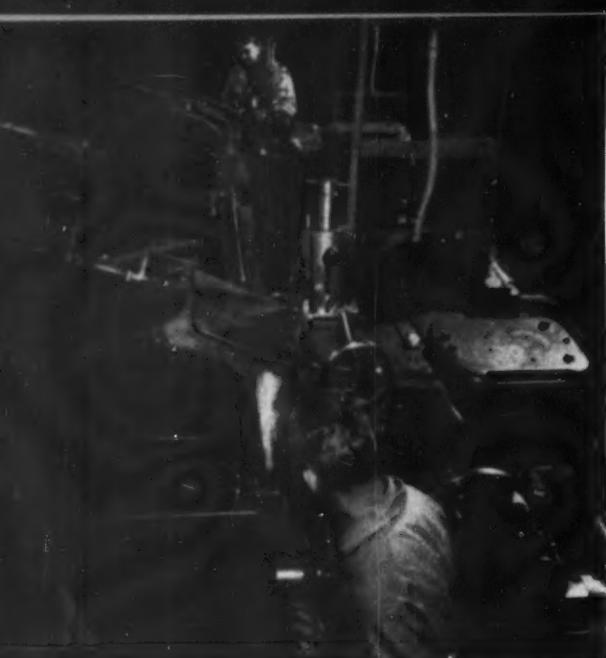
WRITE FOR NEW BULLETIN 731—this 16 page catalog just off the press gives details of all standard Lindberg Air Cylinder models and sizes with complete tables on bores, pressures, weights, mountings and conversion to low pressure hydraulics.

Remember—BULLETIN 731 for COMPLETE DETAILS ON AIR CYLINDERS

**LINDBERG**  
**AIR & HYDRAULIC CYLINDERS**

Lindberg Engineering Company  
2441 West Hubbard Street Chicago 12, Illinois

**Specify Lindberg**  
when you need HYDRAULIC CYLINDERS  
OIL HYDRAULIC PUMPING UNITS  
MILL TYPE CYLINDERS • CENTRIFUGAL  
BLOWERS • AIR VALVES



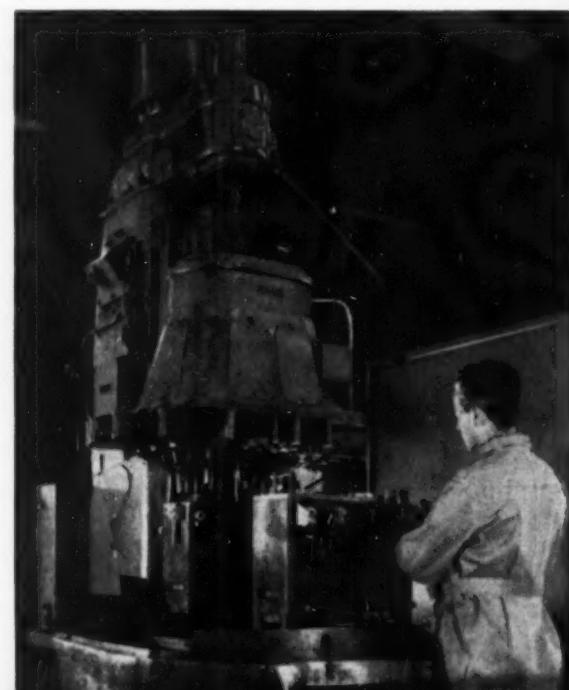
Piston rods for Bendix hydraulic cylinders are rough and finish ground in the two Cincinnati No. 3 centerless grinders arranged in tandem, as shown here.

holder on single-purpose equipment; however, in most cases, Bendix tool engineers have found that attachments can be moved from position to position for positive alignment by surfaces, keyways, dowels, and so on, in job-lot production—all of which requires accurate first-quality

machines with good foundations and means for constantly checking and adjusting levelness.

not be driven at the most efficient speed with drills of every size, feed speeds and distances are respectively reduced or increased as necessary to permit the constant use of standard cams. However, the cost of these compromises is quite small in view of the advantages that are gained.

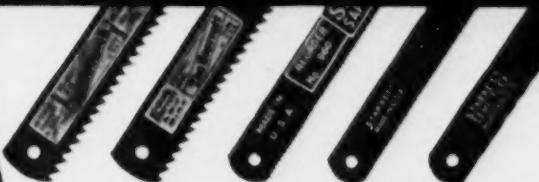
An important factor in reducing the quality of parts which could feasibly be run with high-production machines was the accuracy of tool and attachment-locating surfaces. In some circumstances, it was satisfactory to scrape and fit each fixture and



The Natco B-2B drilling machine shown here is used in multi-hand drilling operations at plant No. 2 of the Bendix Aviation Corporation.

**FOR BETTER, FASTER CUTTING AT LESS COST**

**Starrett  
HACK  
SAWS**



Choose the right blade for any job from the complete line of STARRETT S-M Molybdenum M-2 High Speed Steel hand and power blades, High Speed Steel

(18-4-1) hand and power blades, "Safe-Flex" High Speed Steel hand blades and Starrett Standard all hard, flexible back and "Semi-Flex" hand blades.

**ALL FROM ONE DEPENDABLE SOURCE**

**Starrett  
BAND  
SAWS**



STARRETT hard edge, flexible back metal cutting band saws for precision sawing; jig and contour cutting and friction sawing; spring temper band saws for cutting metal, wood and plastics; Starrett "Sag-Touch" for cutting magnesium,

aluminum, bronze, soft brass and other non-ferrous metals; also composition, fibre, bakelite, plastics and wood; and Starrett wood cutting band saws. Furnished in coils in new handy reel dispenser or cut to length and welded.

**PRECISION MADE BY THE WORLD'S GREATEST TOOLMAKERS**

**Starrett  
BAND  
KNIVES**



Starrett FAST-KUT Band Knives are unsurpassed for stack cutting, trimming, slicing or cut-apart operations involving soft or fibrous materials. Cut clean and

fast without waste, chips, dust or ragged edges. Available in a complete range of sizes in straight-edge, scallop-edge or wavy-edge types—single or double bevel.

TRADE MARK  
**Starrett**

REG. U.S. PAT. OFF.  
**STANDARD OF PRECISION**

**Buy Through Your Distributor**

Mechanics' Hand Measuring Tools and Precision Instruments  
Blast Indicators • Sheet Tapes • Precision Ground Flat Stock  
Hacksaws, Band Saws and Band Knives



#### **COMPLETE INFORMATION**

Starrett Hacksaw and Band Saw Catalog gives cost, performance and application data for the complete line of hacksaws, band saws and band knives.

Starrett Quick Reference Metal Cutting Guide instantly gives complete information for cutting any metal by hacksaw or band saw.

Write for your FREE copies  
Address Department "MD"  
THE L. S. STARRETT COMPANY  
Athol, Massachusetts, U.S.A.





Fig. 1—This small segment of the huge Douglas shops indicates immediately the value of simplifying equipment lubrication problems.

## West Coast aircraft manufacturer reduces number of lubricants required in maintaining effective operation of plant equipment.

By GILBERT C. CLOSE

**I**N 1942, 48 different oils and greases were being used to lubricate the many thousands of pieces of shop and factory equipment at the El Segundo plant of Douglas Aircraft Company, a view of which is shown in Fig. 1. Today, seven major oils and greases are used to do the same job, with better results obtained.

This vast simplification program, resulting in a 700 per cent reduction in the number of lubricants used, was

not accomplished through arbitration of lubricating properties, nor by copious substitutions. It resulted from a careful study of plant lubrication requirements and the development of company oil and grease specifications for multi-purpose lubricants that would effectively replace several of those being used at the time.

"We had several reasons for instituting this simplification program," says Leonard Stagnaro, departmental

supervisor in the Plant Engineering division. "We wanted first to simplify the physical aspects of lubricating shop equipment, thus making it easier and less complex for the oilers. Secondly, we wanted to reduce the large inventory of oils and greases we were carrying. Finally, we wanted more precise control over shop lubrication in the interests of efficiency and longer machine life."

To start the program, Douglas officials invited engineers from a large oil company to make a complete survey of shop lubrication requirements. These engineers were instructed to keep in mind that a reduction in the number of lubricants then being used was desirous whenever a single lubricant could be made to serve more than one purpose. Reports obtained from this survey furnished basic information used in developing the Douglas oil and grease specifications.

Comparison and study of the Douglas specifications, plus comparison of these specifications with actual product specifications furnished by the oil company, indicated other possible replacements to further reduce the number of lubricants used. In all cases, close shop observation of the new

lubricant under actual operating conditions was employed to supplement the original opinion. The net result is that after eight years of concentrated study and effort, 3 major lubricating oils, 2 greases, and 2 gear oils provide the bulk of all lubricants used in the plant. There are a few instances, of course, where specialized products are required, such as refills and additions for the Hydrotel reservoirs, high-pressure lubricants, and so on, but these fall outside the routine plant lubrication problems.

The principal requirement of all Douglas El Segundo oil and grease specifications is that the product must be refined from a 10 per cent paraffin base mid-continent crude oil. Other specification requirements include rigid control over viscosity, the viscosity index, gravity, flash point, pour point, carbon residue, additives, and so on.

When a new machine is purchased for plant use, every effort is made to lubricate it with the oils and greases



Fig. 2—Plant lubricant inventories were reduced 200 per cent by the Douglas studies. This illustration shows a view of the main storeroom.



Fig. 3—Stocks of plant lubricants were reduced and simplified by the Douglas studies in plant lubrication. The three barrels shown contain the only three oils used for the great majority of oiling applications.

lubrication, received as much concentrated study and effort as did the reduction in number of lubricants employed. Of course, in this conjunction, fewer lubricants contributed substantially to better control. A card system was set up, with a lubrication card

covered by the Douglas specifications. "In most cases to date, we have been able to use one of our standard lubricants and obtain equal results," Stagnaro says. "This control is necessary or in time we'd be back on the old multi-lubricant basis."

As illustrated in Figs. 2 and 3, the reduction in the number of lubricants used has resulted in a reduction of inventory values in excess of 200 per cent and a reduction of inventory space requirements exceeding even this figure. Problems involved in purchasing, stocking, identifying and handling of the stores have been simplified accordingly.

The final phase of the program, more precise control over plant equipment

developed for each machine, detailing the number of points to be lubricated, the method of lubrication, how often lubrication of each point was required, and the type of oil or grease to use, as shown in Fig. 4. These cards are provided with cross-checks so that the oiler can make sure he has lubricated every point on the machine that requires it.

Additional simplification is provided by color-coding each oiling point on each machine to indicate the frequency of lubrication, as shown in Fig. 5. This coding is accomplished by painting a dash of the right color adjacent to the oil hole, fitting, or reservoir filler orifice. At Douglas, red is used to indicate points that require daily lubrication,

orange for points that require bi-weekly or semi-weekly attention, yellow for weekly oiling, and green for monthly oiling. The total number of each color code for each machine is listed on the card and may be cross-checked with the detailed service frequencies to make certain that all points have been oiled or greased.

The lubrication card is kept in a cellophane holder on the machine for which it is used to provide lubrication control, as shown in Fig. 6. Duplicate master cards are kept in the Plant Engineering office. In case of loss of the card, its defacement, or if it becomes dirty and illegible, the oiler must notify the main office so that the card can be replaced immediately.

The oiler and mechanic are made mutually responsible for machine operation, and cooperate closely with the machine operator to attain this end. Stagnaro points out that this ar-

rangement is especially useful in breaking in new employees. Thus, if an oiler new to the job cannot locate the various oiling points listed on the lubrication card, he will discuss the subject with the operator and ask his aid. Similarly, if the mechanic notes undue wear due to lack of proper oiling, he will call it to the attention of the oiler so that remedial steps may be taken.

Machinery and equipment oiling and greasing is a full-time job established on a routine basis to minimize the possibility of errors or missed equipment. Each oiler is assigned a specific plant area and is provided with a hand cart containing portable stocks of the necessary lubricants and whatever specialized products he may require. Each cart is also equipped with the necessary grease guns, fittings, and measures. Each of the lubricants is designated by trade name, the same

RECOMMENDED LUBRICANTS FOR DOUGLAS AIRCRAFT COMPANY, INC.				
Machine Make & Model UNIT	Jones & Lamson Turret Lathe METHOD	Model No. 5 SERVICE	Equipment No. RICHFIELD LUBRICANT	
Headstock	Reservoir	1 Daily	Eagle Oil Medium	
Carriage Apron	Reservoir	1 Daily	Eagle Oil Medium	
Turret Apron	Reservoir	1 Daily	Eagle Oil Medium	
Feed Gear Box	Reservoir	1 Daily	Eagle Oil Medium	
Pend Rod Support	Oil Gun	1 Daily	Eagle Oil Medium	
Rapid Traverse Apron	Reservoir	1 Daily	Eagle Oil Medium	
Rapid Traverse Rod Support	Oil Cup	1 Daily	Eagle Oil Medium	
Rapid Traverse Gear Train	Reservoir	1 Daily	Eagle Oil Medium	
Square Turret	Oil Screw	1 Daily	Eagle Oil Medium	
Stock Feed Chuck Support	Oil Cup	1 Daily	Eagle Oil Medium	
Turret Clamp Ring	Hand Oiled	1 Weekly	Eagle Oil Medium	
Cross Feed Hand Wheel	Zerk	1 Bi-weekly	Series 56 Grease	
Drive Motor	Alemite	2 3 Months	Ball Roll #2	
Coolant Motor	Oil Cups	2 Monthly	Eagle Oil Light	

Service Code	Red, Daily	Orange, Biweekly	Yellow, Weekly	Green, Monthly
--------------	------------	------------------	----------------	----------------

Fig. 4—Illustration of typical lubrication chart.

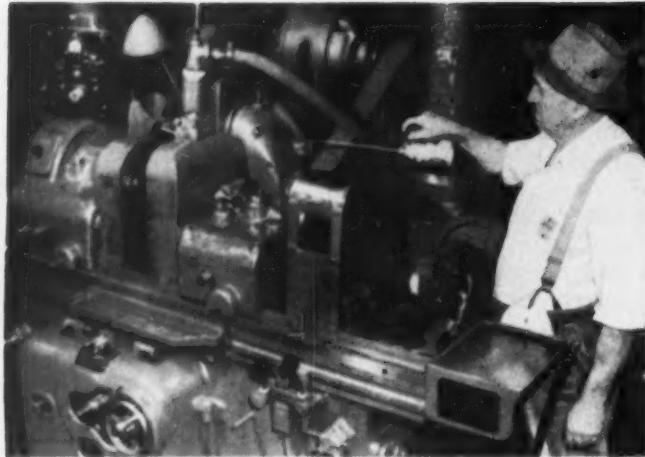


Fig. 5—No questions arise regarding type of lubricant to use or frequency of oiling. Such information is provided on the lubrication card furnished for each machine and by color coding on the machine itself.

as they are on the lubrication card. It has been found less conducive to error to use these trade names than to try and substitute the applicable Douglas specification number.

All personnel engaged in oiling are kept constantly aware of the importance of their job. They are informed of the cost of machine down time caused by failure due to improper lubrication. A short slogan used in the department provides sound advice . . . "A little oil at regular intervals is the best protection; a lot of oil, too late, won't save an injured part."

Plant lubrication studies at Douglas were extended to include even the min-

eral oils used in the various hydraulic machines and equipment. Formerly, there was no established routine regarding hydraulic oil changes. The oil was changed either when it appeared dirty or discolored or when additions to the reservoir were required. Today, this situation has been rectified.

To begin with, samples of oil from the various hydraulic reservoirs were submitted to the Process Engineering laboratory once every three months for analysis. The Process Report indicated the condition of the oil and whether a change was required. As progress was made along this line, more time between oil checks and changes was indicated. The period was first extended to six months. Now, except in the case of an emergency,

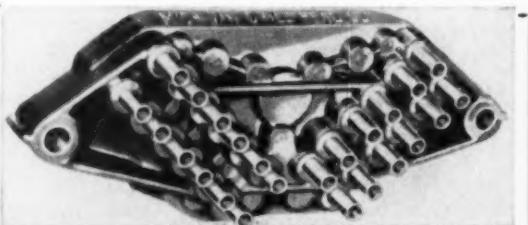
Pictured: a 24-Spindle Heavy-Duty Drill Head.

DESIGNERS AND  
MANUFACTURERS  
OF MULTIPLE DRILLING EQUIPMENT.

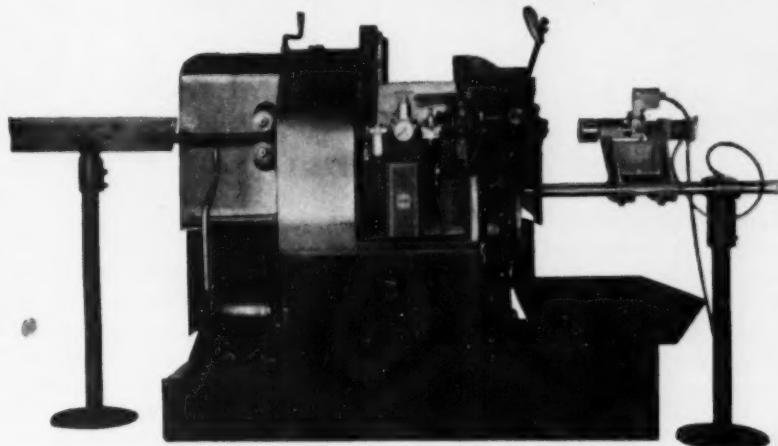
We invite Your Inquiry.

MICHIGAN DRILL HEAD CO.

971 E. 8-Mile Road, Hazel Park, Mich.



## The NEW MODERN AUTOMATIC CUTTING-OFF MACHINE



### Cuts Off Tubing, Pipe and Shafting . . . FAST

Cuts off longer pieces than a regular automatic machine. In fact, cuts off any length you want—and cuts it *faster*. If your production requires quantity cutting-off of tubing, pipe or shafting, check the figures below against your present time.

#### **1/2" Tubing**

This machine cuts off and chamfers both outside edges of  $\frac{1}{4}$ " .030 wall tubing, 5" long at the rate of one every 2.5 seconds.

#### **1 1/4" Cold Rolled**

This machine cuts off and chamfers both ends of  $1\frac{1}{4}$ " cold rolled, 20" long, at the rate of one every 20 seconds.

#### **1" Tubing**

This machine cuts off and chamfers both outside edges of 1" long, at the rate of one every 3 seconds.

These popular, time saving machines are now available in two sizes, handling work up to 3" O.D. Their many cost cutting features are described and illustrated in our latest catalog that will be mailed promptly on request.

#### **4" Threaded Studs**

Cut and chamfered at one time—in 8 seconds from 10 ft. length of stock already threaded. ( $\frac{3}{8}$ " U. S. Standard.) Clean cut. Clean chamfer. Nuts start easily, with no extra finishing required.

**WRITE FOR ILLUSTRATED CATALOG.**

**MODERN MACHINE TOOL CO.**  
*Jackson, Michigan*

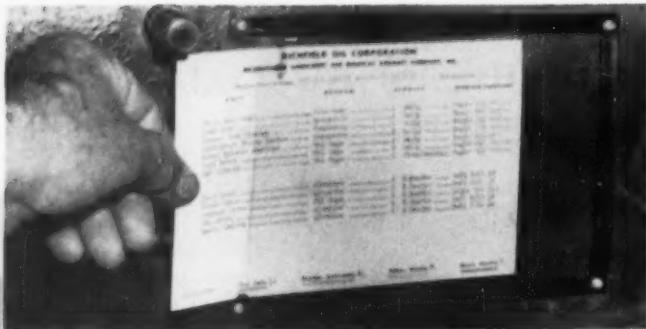


Fig. 6—A lubrication card detailing lubrication requirements and frequencies is kept in a cellophane holder on each machine.

checks are made but once a year, and additions can be made as required with complete confidence that the oil already in the machine is in good condition.

"Cleanliness is the main requirement of mineral oil used as a hydraulic fluid," Stagnaro says. "Except in a few cases where considerable heat is

generated by constantly applied pressures in a by-pass system, the lubricating properties of the oil are not affected. In those cases where considerable heat is generated, oil cooling facilities are added to the machine."

In purchasing plant equipment lubricants, the Douglas El Segundo plant adheres to the products of a single oil company except in specialized cases. This procedure eliminates the neces-

## COMET

### BORING, FACING, and INTERNAL THREADING TOOLS

For holes from  $\frac{1}{8}$ " upward, 15 different sizes.

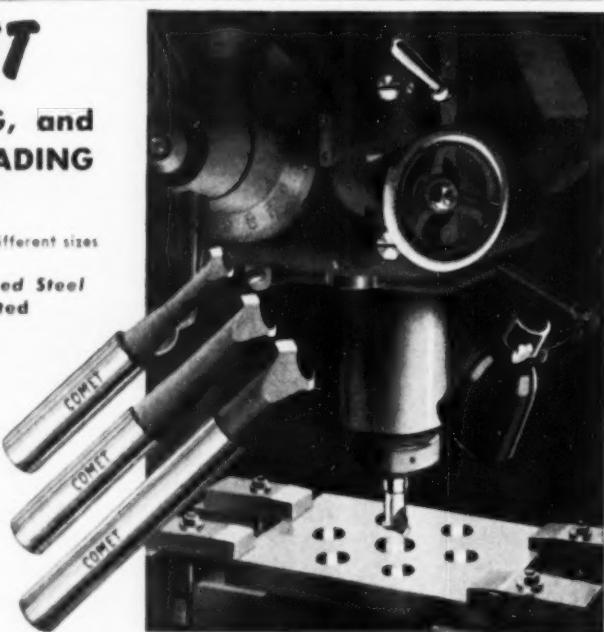
**Made of Super-High-Speed Steel  
Specially Heat Treated**

Indispensable for your JIG BORER. The worm-like spiral of the boring heads provides a long useful cutting surface. Their use insures perfect fitting threads. Correctly designed for precision work.

Write for complete data.

**Comet Tool Co.**

738 Broadway  
New York 3, N. Y.



**6 SURFACES ON  
PIECES IN  
12 MINUTES**

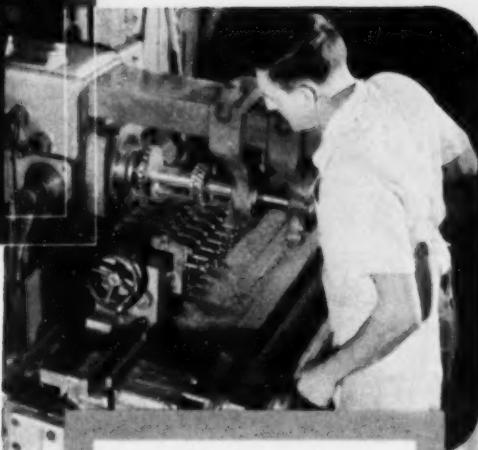
With  
**BARBER-COLMAN**  
**JOB-ENGINEERED**  
**PROFILE GANG CUTTERS**

Simple arithmetic shows this to be milling cutter efficiency. There is no need for taking 6 cuts in one piece, or one cut in 6 pieces, when it can be done just as easily all in one pass with job-engineered Barber-Colman Gang Cutters. In this case, it takes only 12 minutes to do the job complete... or two minutes each.

On-the-job efficiency for many milling operations is built into cutter design by Barber-Colman



Get this complete catalog of Standard and Special Milling Cutters and Reamers.  
Write for File No. 8549.



#### JOB FACTS

Operation — Gang Mill 6 Surfaces in 1 pass  
Material — Cast Iron  
Cutters — B-C Job-Engineered Profile Gang Cutters  
Production — 30 pieces per hour,  
Floor-to-Roof  
Feed — 3'/min. Speed — 100 RPM  
Tool Life — 1000 pieces per gang  
sharpening

cutter engineers. Their experience with a multitude of job conditions has provided the answer to rising costs and lower productivity on many production milling jobs. Get this same efficiency for your production problems. Call a Barber-Colman engineer for recommendations.

**Barber-Colman Company**

General Offices and Plant, 8549 Loomis St., Rockford, Ill.

# NEW

**Outstanding Addition to  
AUTOMATIC FLEXOPRESS LINE**



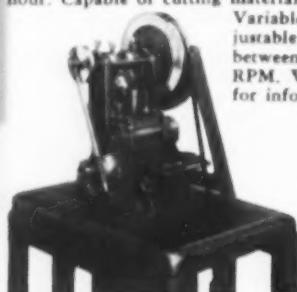
### 12 TON PRESS

The success of the Automatic 1½ to 2 ton press prompted many inquiries for a larger press. Now we can announce the addition of the new 12 ton press to our standard line. High speed, completely automatic and capable of cutting materials in lengths up to 12".

### 1 ½ TO 2 TONS

The 1½ to 2 ton press completely automatic. Can produce 9,000 to 40,000 pieces per hour. Capable of cutting materials up to 9".

Variable speed, adjustable to values between 150 to 600 RPM. Write today for information.



**Ace Tool & Die Works**

129 E. MCMICKEN AVE., CINCINNATI 10, O.

sity of changing the trade names used on the lubrication cards, and makes it easier for the oiler to gain and maintain familiarity with the products he is using.

In brief summary, the equipment lubrication studies at the Douglas El Segundo plant show what can be accomplished by many companies along the same line. Equipment lubrication, despite its vital function in maintaining efficient machine operation and prolonging life, is often conducted haphazardly. If long range cost cutting is a company goal, a good place to start is with proper equipment lubrication.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.



"Looks like they finally got converted to defense production."

# Production Pointers

from

# GISHOLT



COST  
CUTTING  
IDEAS



## Gisholt—A Unique Service in the Machine Tool Industry

Here you obtain unbiased help on your turning problems, because Gisholt's broader range of equipment includes both manually operated turret lathes and automatic lathes. Gisholt's recommendations are made without prejudice for one type of machine over another.

## FAST 2-OPERATION JOB MADE FASTER BY RAPID CHANGEOVER OF NO. 12 HYDRAULIC

### MINIMUM TOOLING MEETS TOTAL PRODUCTION REQUIREMENTS

The low floor-to-floor time for both machining operations on these aluminum housings is typical of the efficient production you can expect from this machine. It takes but 1 minute flat for the 1st operation and only 1.5 minutes for the 2nd. And, the same machine is used for both operations. The total changeover time between operations is just 15 minutes.

#### SMART PLANNING

Careful planning makes this possible. Interchangeable tool blocks are mounted on the front carriage with the same mounting holes. The rear tool block is so designed that the tool bits can be quickly repositioned. Even the holding fixture is arranged so that it bolts on to the face of the 1st operation chuck. Everything is planned for a minimum of changeover effort and time.



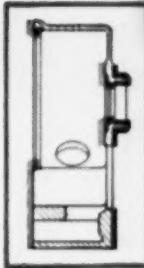
The line separates the tooling for the two operations on this housing. Tooling on the machine covers the 1st operation and tooling at the right covers the 2nd operation.

Not only is the low changeover time important, but the operator is free to handle other machines during the automatic cycle. Whether you have high or low production, this economical, single spindle machine should be investigated. Write for free literature on the No. 12 Hydraulic Automatic Lathe.

A single No. 12  
Hydraulic per-  
forms both of  
these operations.

■ 1st operation

■ 2nd operation



TO GET MORE OF YOUR MONEY'S

NEW

## TURRET LATHE AND ROLLING "MILL" IN ONE!

VALVE WEDGES  
MACHINED, SEAT  
RINGS ROLLED-IN

—ALL BY 1 GISHOLT

Brainwork and the adaptability of Gisholt

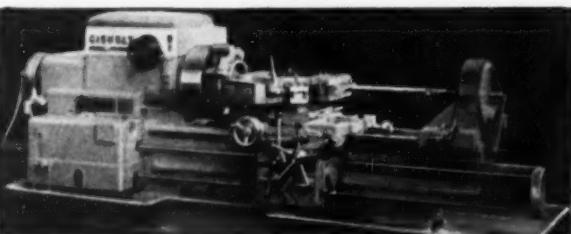
Turret Lathes really pay off. It used to be that *three* machines were needed for machining these gate valve discs and for rolling in the seat rings. Now, with the addition of an air-operated pusher-bar to a standard 2L Turret Lathe, all operations are performed on one machine in one chucking.

Imagine the benefits: saving handling time and costs, freeing two machines for other work and lower labor requirements.

This Gisholt 2L Saddle Type Turret Lathe is equipped with cross-feeding turret, air-operated chuck, pusher bar.

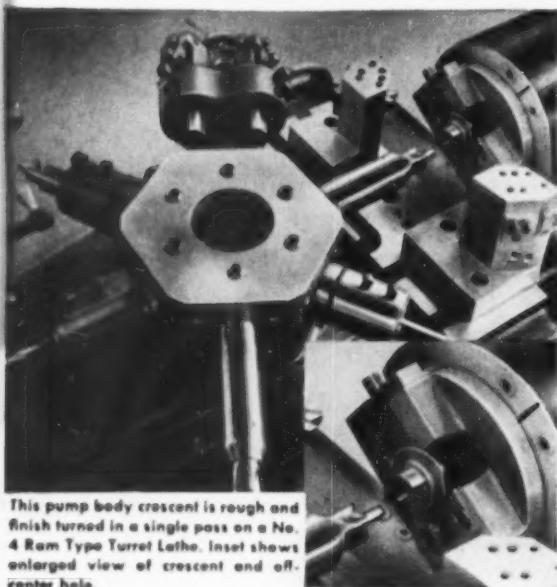


One Gisholt does all jobs on these 2 types of gate valve wedges. 1. Shows the rough casting. 2. After being faced and grooved with the dovetail recess for the seat ring. 3. With the seat ring rolled in. An air cylinder with pusher bar provides the required force to rollers carried on the third turret face. Number 4 shows completed valve wedge after seat ring is faced, turned and chamfered in place.



## SMART HEADWORK SPEEDS MACHINING OF PUMP BODY CRESCENT

There are two interesting features to this job—each a story in itself.



This pump body crescent is rough and finish turned in a single pass on a No. 4 Ram Type Turret Lathe. Inset shows enlarged view of crescent and off-center hole.

### ROUGH AND FINISH TURNING IN ONE

On this job, they rough and finish at the same time because the surface is crescent shaped and not a full circle. The rough and finishing tools on the turret are mounted 180° apart in a special multiple turning head. While one tool is cutting, the other has no contact with the work—hence, no tool interference. Thus, the job is rough and finish turned in one pass.

### ECCENTRIC MACHINING IN SAME CHUCKING

To complicate the job, the center hole and inside of the crescent were not concentric with the outside surfaces. So, a special eccentric chucking fixture was balanced for two positions and then mounted on the spindle. After turning and facing are completed, the fixture is moved to put the inside surfaces on the spindle centerline. Then, centering, drilling, reaming and counterboring are handled from the turret.



OVER-AGE MACHINE TOOLS MEAN

**WORTH OUT OF MAN-HOURS**

## PULLEY MACHINING TIME SLASHED FROM 39 TO 13 MINUTES BY FASTERMATIC

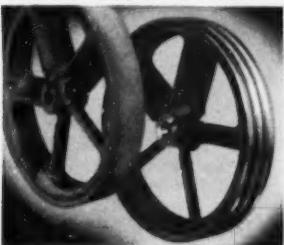
**FINISHED 66% FASTER—  
AND IN 1 OPERATION**

Machining time and costs were cut exactly two-thirds when a Fastermatic Automatic Turret Lathe took over the production of these cast-iron compressor pulleys. Also the operator is able to handle a manually controlled machine in the free time the automatic operation of the Fastermatic provides him.

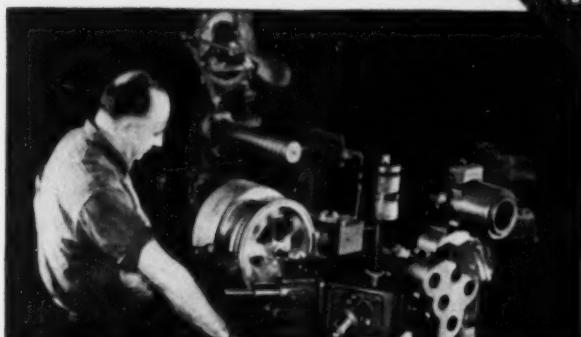
The broad range of spindle speeds and feeds of the Fastermatic are extremely valuable on this job where R.P.M.s move from 36 to 184. The slow 36 is the desirable speed for machining out the V-belt grooves on the rim with form tools. For finish boring of the hub, speed goes up to 184.

### SIMPLE TOOLING

Simple tooling permits all machining in a single chucking—rough and finish turning the OD., and two grooves, side facing, rough and finish boring and chamfer of the hole and spot facing of the hub. Floor-to-floor time—down from 39 to 13 minutes!



Only 13 minutes elapse from this rough iron casting to the finished pulley.



Close-up of the Fastermatic tool set-up for machining pulleys. After loading, the machine cycle is completely automatic.

## IT'S DUCK SOUP FOR THE SIMPLIMATIC BOTH ENDS MACHINED AT ONCE!

This time the Simplimatic Automatic Lathe shows its speed on a differential carrier job. There are two separate groups of tooling which give a snappy floor-to-floor time of 1½ minutes.

The first tooling group covers the conventional front and rear slides. These turn two diameters on the carrier body, and face the outer flange for the ring gear seat.

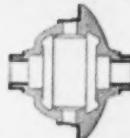
The second group consists of identical tooling on both the standard center slide and on the back boring attachment, which feeds longitudinally through the spindle. As these two sets of tools move together, both hubs are bored, faced, turned in one chucking.

With a setup like this you are machining 11 surfaces. You are saving an added operation (and the handling cost) by machining both hubs in but a single operation.

Another good example of saving with the Simplimatic.



The Simplimatic machines 11 different surfaces on both ends of this differential carrier in 1½ minutes.



The heavy surfaces are handled by the Simplimatic in one operation. Hub at left is handled through the back-boring attachment and hub at right from the center slide. Part is chucked on the large OD.



Now Ready! Your "Equipment Replacement Analysis" Forms

The "Equipment Replacement Analysis" form (as determined by the MAPI formula) helps you to take the guesswork out of the problem of when old machine tools of all types should be replaced—to arrive at sound answers. Aids in determining what and when to replace.

Gisholt has made up this form in a handy 4-page working folder. Write for free copies today.



**UNDER-PAR EFFICIENCY... REPLACE NOW!**



COST  
CUTTING  
IDEAS



**COST  
CUTTING  
IDEAS**

At Baldwin Locomotive Works, they know that, "If it rotates, it should be balanced."

That's why the big crankshafts of the diesels which power Baldwin Locomotives are precision balanced before going into service.

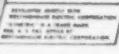
A standard Dynetric Type 6-UH Balancing Machine, especially adapted for this work, is shown balancing a giant 8-throw, 4790-lb. diesel crankshaft. This one machine handles all of Baldwin's present—and future—crankshaft requirements. The machine balances these parts to such a degree of accuracy that the crankshaft will vibrate less



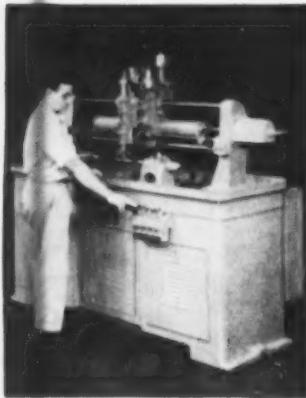
4790 lbs. of crankshaft which, after balancing, has an accuracy of one-pound-inch, or equivalent to a measurable displacement of .0002 at either end. than .0002". After unbalance is located and measured, correction is made by drilling out the excess metal.

Such careful attention to quality is one reason these diesel-electric locomotives are constantly setting such high performance records.

Balancing is explained in a valuable 36-page booklet which is mailed free on request. Write on your letterhead.



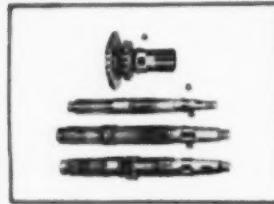
## OIL SEALS REALLY SEAL—THANKS TO SUPERFINISH



Thirty-eight seconds after the operator starts the Superfinisher, the oil seal surface of this shaft is finished from 25 to 30 micro inches to 3 to 8 micro inches.

No more troubles of leaking oil seals for J. I. Case Co. Superfinish has ended them.

Many different tractor shafts and sleeves are now Superfinished—at 38 seconds per part—on a standard Gisholt Model 52A General



Here are four of the wide assortment of parts this firm is Superfinishing. Arrows show surfaces which have been Superfinished. Largest part in this photo is 24" long. Machine handles parts up to 36".

Purpose Cylindrical Superfinishing Machine.

In a previous (and very economical) grinding operation, surfaces are brought down to high limits of size and a finish of 25-30 micro inches. Then operator merely loads the Superfinisher and presses a button. The machine with its automatic cycle provides a finish of from 3 to 8 micro inches in just 38 seconds. Changeover to other parts takes but 10-15 minutes average.

Shaft sealing surfaces are now so smooth no break-in is necessary. Leakage is reduced, higher oil pressures can be used when needed. Because there is virtually no surface roughness, the fine finish lasts indefinitely.

Write today for your free copy of **WEAR AND SURFACE FINISH**—an 80-page textbook on Superfinish.



No. 1250

THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

**GISHOLT MACHINE COMPANY**  
MADISON 10, WISCONSIN

A general catalog on machines listed below is available on request.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

**120 to 150 pcs. per min.**

*produced on this Hartford Special*

## **AUTOMATIC THREAD ROLLER**

Completely Automatic Feed

Filtered Lubrication

Table Top Working Level

Vibration Free Operation

Quick, Easy Set-ups

Class 3 Fits



diam. from .086" to .190"  
thread lengths from  $\frac{1}{8}$ " to  $1\frac{1}{2}$ "

**WRITE FOR BULLETIN NOW!**

**HARTFORD**

*Special*

*the best buy in the long run*

**THE HARTFORD SPECIAL MACHINERY CO.**

287 Homestead Ave., Hartford 8, Conn.

Please send me free Bulletin TR-100 describing your Automatic Thread Roller.

Name \_\_\_\_\_ Post \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



# Handling Work on Circular Dials

C. W. Hinman

The discussion covers the setup and operation of dials for feeding a variety of metal parts in presses.

Methods for ejecting finished work from dials are also explained.

By C. W. HINMAN  
Designing Engineer

VARIOUS methods may be used to operate circular dials in presses. In a recently developed design, for example, the dial is operated by an automatic compressed-air cylinder that contains a piston head. This equipment is located underneath the dial and is actuated by means of a three-way valve. When the valve is automatically tripped by action of the press, it operates the piston head and its attached pawl which indexes the dial one station ahead and then locks it in correct position for the next cycle of work. The next operation of the valve permits a tension spring to return the pawl to its normal position, ready for another indexing cycle.

These dials, which are commercially available, are used not only on press tool operations, but also on drilling, milling, and spot-welding fixtures and on special machine operations.

## Operation of a Safety Dial

Figure 1 shows an inclinable press equipped with a spring counterbalanced ram slide. The counterbalance counteracts the weight of the ram and causes smooth, easy action in operation; it also stops the press quicker than when out of balance. The ratchet type dial shown on the press is especially designed for safety of operation. It consists of a vertically mounted sliding stop block, shown at the right rear of the dial, which is operated by the press clutch and is designed to register in one of the dial notches, if conditions are normal. However, if the dial should be indexed erroneously, the stop cannot enter the notch, and a lever disengages the press clutch automatically and stops the press before the ram can descend far enough to injure the dial or tools. A hand lever lo-

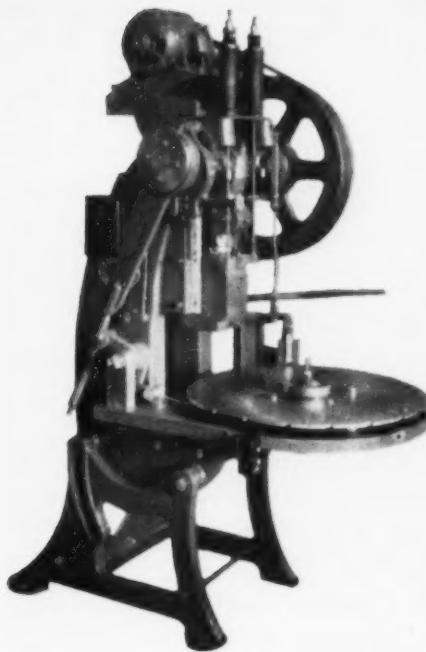


Fig. 1—Inclined press equipped with spring counterbalanced ram slide and ratchet type safety dial feed. Illustration courtesy E. W. Bliss Company.

cated under the flywheel "trips" the press clutch into action similarly as a treadle on the floor. The dial is driven by an eccentric crank at the left end of the press crankshaft. The arm can be adjusted to length of feed by means of a screw located in a coiled spring, as shown at the lower left of the press.

#### Under-Drive Dials

Figure 2 shows a power press equipped with an under-drive dial which differs in construction from the regular dial feed inasmuch as the dial that carries the work is a plain round disc having a ring enclosure under its edge. The disc can be made from any hard metal of the required thickness and diameter. As its name implies, the under-drive dial is indexed by a separately notched dial mounted underneath the work dial to which it is at-

tached by screws and dowel pins. Since the work dial is comparatively inexpensive, a separate dial can be made for each job and dials quickly interchanged on the machine.

The indexing dial must be made accurately. It should have hardened and ground edges and ground notches so that it can be indexed within limits of plus or minus 0.002 inch or better. The indexing dial is usually about one-half or two-thirds the diameter of the work dial.

The supporting ring is placed under the work dial and can be cut away to expose the die in the rear. The dial is indexed by an adjustable eccentric on the crankshaft of the press and is driven through a bell crank to the sector arm on which the driving pawl is mounted. This type of work dial can be adapted to a wide variety of dial press work.

The work dial shown in Fig. 2 is 48 inches in diameter and is used for assembling the sections of toy train tracks. The under dial is driven by a  $\frac{1}{2}$  h.p. electric motor. This type of press and dial is well suited for use in assembling large and medium size work. The press has a safety attachment that prevents its operation if the dial is improperly located.

#### Dial Feeds for Cartridge Cases

During World War II, many dial feeding mechanisms were designed and built. A particularly interesting design of dial feeding mechanism developed at that time is shown in Fig. 3,

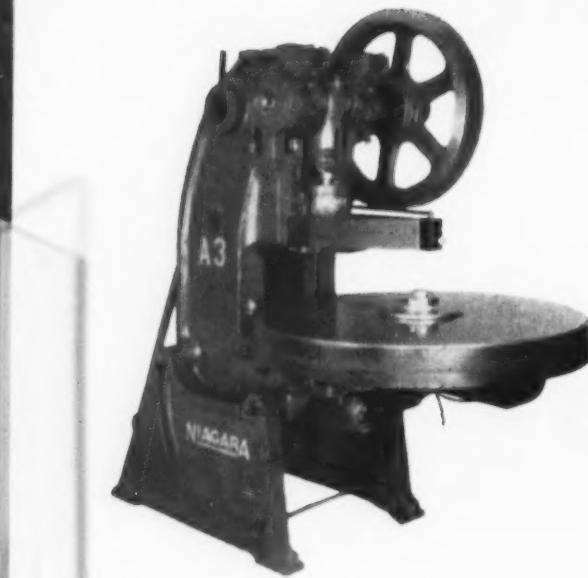


Fig. 2—Power press equipped with under-drive dial feed. Illustration courtesy F. J. Littell Machine Company.

which also shows a battery of five straight side presses for producing 20 mm. cartridge shells. Dial feeding batteries similar to these were also used in the production of cartridge cases up to 105 mm. in diameter.

The presses as shown are adapted for blanking, cupping, redrawing, and marking shells. Each dial is bored at eight equally spaced positions to accommodate suitable adapters for carrying the work intermittently under the center of the press ram

where it is permitted to drop into the die, one piece at a time. Indexing of the dial is effected through a shaper-motion arm at a 120-degree revolution of the press crankshaft.

In operation, the press operator drops a piece of work into each adapter located in the dial where it is carried halfway around, over the die and directly under the punch. At this point, the condition of the work dial is electrically inspected automatically so as to determine whether or not the shell is properly located under the punch. If registry is correct, the ram is permitted to descend and the punch draws the shell down into the die. When the punch ascends, the work is stripped off underneath the die and then falls out below.

#### **Underfed Dial Performs Four Operations**

Figure 4 shows a 24-station underfed dial designed for use in flattening, piercing, trimming, and stamping

## **LUERS**

### **PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES**

**ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.**

*Manufactured by*

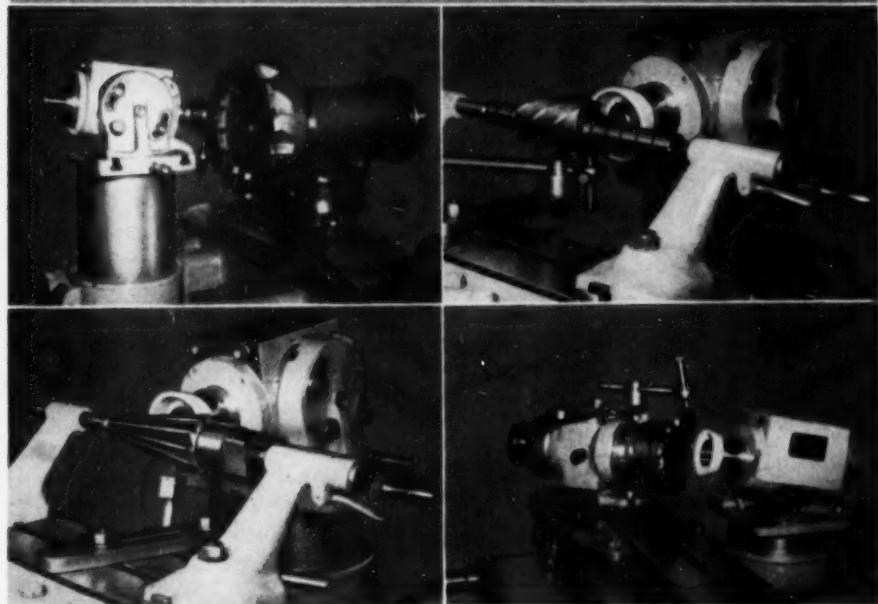
**J. MILTON LUERS. 12 Pine Street, Mt. Clemens, Mich.**

Produced under License Issued by John Milton Luers Patents Inc.

# NEW

with new adjustment

This POPE  
Motorized  
Tool and Cutter Grinder  
SPINDLE



Here's one you've always wanted — a totally enclosed, sealed lubrication, super precision 1 HP, 3600 RPM motorized tool and cutter grinding head, mounted on a new bracket that provides angular adjustment in a vertical plane.

POPE Spindles have the radial and axial rigidity to make wheels cut faster — spark out

quicker. Grinding time is reduced. Softer wheels can be used for cooler grinding and for producing the kind of cutting edge that stands up.

Make the most of your present grinders. Equip them with this new and better POPE Spindle.

Ask us to quote price and delivery.

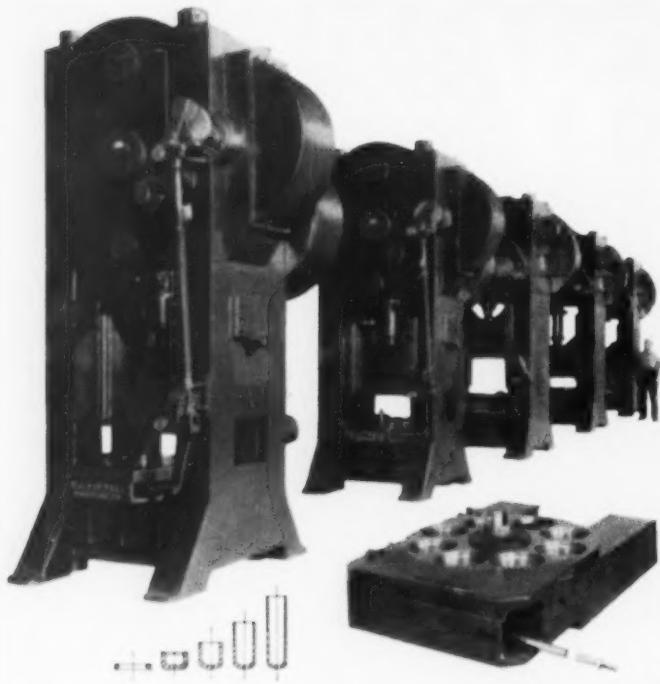
SPECIFY THIS POPE SPINDLE ON YOUR NEXT TOOL AND CUTTER GRINDER

No. 71

# POPE

TRADE MARK REG. U.S. PAT. OFF.

POPE MACHINERY CORPORATION  
ESTABLISHED 1920  
261 RIVER STREET • HAVERHILL, MASSACHUSETTS  
BUILDERS OF PRECISION SPINDLES



**Fig. 3—Battery of five straight side presses for producing 20 mm. cartridge shells. A dial feeding mechanism of the type shown in the foreground is used on each press. Illustration courtesy F. J. Littell Machine Company.**

### Ejecting Work with Pick-Off Arms

The ejection of finished parts from circular dials can be accomplished in several ways: (1) Punches can be made to "pick up" finished pieces and eject them near the top of the press stroke.

(2) Finished work can be pushed through the next hole after completion. (3) An air blast can be used to blow the work clear of the dial. (4) A special "pick off" can be attached to the press to pick the workpieces out of the dies and eject them from the machine. The latter method of ejecting

characters on electric terminals. The pick-off mechanism is not shown but is similar in principle to the one shown in Fig. 5. The work has four mounting holes which are drilled in a jig, and each piece is located at its station on pins that correspond with two of the holes.

### A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.

The Heimann Transfer Screw Set is a self-contained complete tool. No wrenches or pliers are necessary. Made in  $\frac{1}{8}$ " to 1" diameters. Send for price list.

**HEIMANN MFG. CO.**

330 Lincoln Ave.

Urbana, Ohio

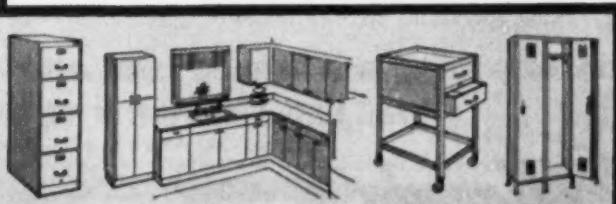


# LYON

**MAKES**  
more than  
**1500**  
regular cataloged  
items of steel  
equipment . . .

WILL MAKE  
special contract  
items to your  
specifications

**LYON** METAL PRODUCTS, INCORPORATED  
General Offices: 1238 Monroe Avenue, Aurora, Illinois  
Factories: AURORA, ILLINOIS • YORK, PENNSYLVANIA  
Sold Nationally through Factory Branches and Dealers



A PARTIAL LIST OF LYON PRODUCTS

- Shelving • Kitchen Cabinets • Tool Boxes • Filing Cabinets
- Lockers • Cabinet Benches • Economy\* • Tool Room
- Stools • Storage Cabinets • Locker-Racks • Equipment
- Bin Units • Welding Benches • Parts Cases • Display Equipment
- Bar Racks • Conveyors • Flat Drawer Files • Drawing Tables
- Revolving Bins • Wood Working
- Work Benches • Bench Drawers • Service Carts
- Tool Stands • Hopper Bins • Shop Boxes
- Hanging Cabinets • Folding Chairs • Sorting Files • Tool Trays
- Drawer Units • Shop Desks

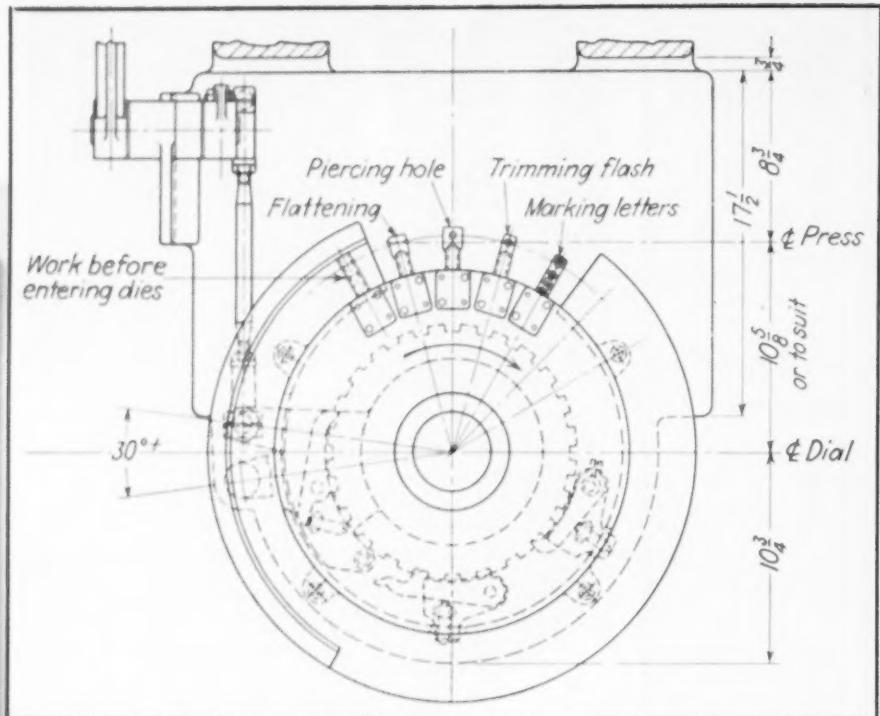


Fig. 4—Drawing of typical underfed dial showing necessary dimensions for mounting on Niagara No. A 3/16 press. Illustration courtesy F. J. Littell Machine Company.

work is illustrated in Fig. 5. The dial as shown set up in the illustration is adaptable for assembling skate rollers, casters, wheels, doorknobs, lock parts, detonators, and fuse parts, as well as for staking operations and for broach-

ing light socket wrenches. The view at the left shows the position of a special pick-off arm just before the press slide releases it for ejecting finished work from the dial. The view at the right shows the ejecting position of

**DIRECTS A BEAM OF WHITE LIGHT ON YOUR CLOSE PRECISION WORK**

**Uneeda**  
**LIGHT**

Write for  
Literature

Tool and Die Makers acclaim it for utility, getting into nooks or crevices hard to reach with ordinary light—for lining up punches in dies or working with the scribe in close places. Completely adjustable and portable. Light does not reflect back to your face. Ideal for inspectors seeking burrs, flaws, etc.

Price complete with 2 size bulbs \$12.50.

**TWENTIETH CENTURY  
MANUFACTURING CO.**

114 MONROE AVENUE CHICAGO 14, ILLINOIS

# ALWAYS YOUR BEST BUY... ALL WAYS

## Ettco-Emrick TAPPERS



*World's most complete line  
of High-Speed Tappers*



TAPPING ATTACHMENTS  
DRILL AND TAP CHUCKS  
FIXED AND ADJUSTABLE MULTIPLE  
SPINDLE HEADS  
FOOT OPERATED AND ELECTRIC AIR  
TAPPING MACHINES  
INDEXING FIXTURES  
SPECIAL MACHINES

- **FIT ANY MAKE OF DRILL PRESS**

Quill clamps give absolute rigidity and accuracy.

- **LONG TROUBLEFREE SERVICE**

Engineered lubrication and ventilation assures continuous smooth operation.

- **HAIR-TRIGGER SENSITIVITY**

Exclusive leather clutch design provides extremely sensitive feel, protects taps and work.

- **AUTOMATIC REVERSE**

and tap idling in cutting direction prevents chamfering, speeds up tapping, promotes longer tap life.

- **VISIBLE GRIP CHUCK**

Holds all size taps within tapper range. Assures true centering on the round and positive driving on the square.

Ask your distributor for  
details or send for

**BULLETIN No. 22**



ETTCO TOOL CO., 598 Johnson Ave., Brooklyn 6, N. Y.  
Please send Bulletin No. 22 describing Ettco-Emrick Tapping Attachments.

Name \_\_\_\_\_

Company \_\_\_\_\_ Position \_\_\_\_\_

Address \_\_\_\_\_

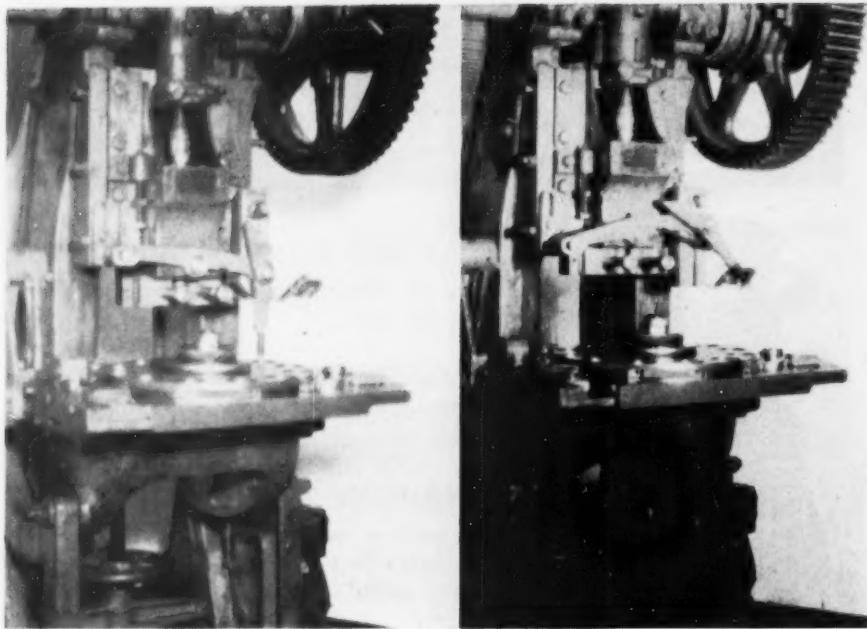
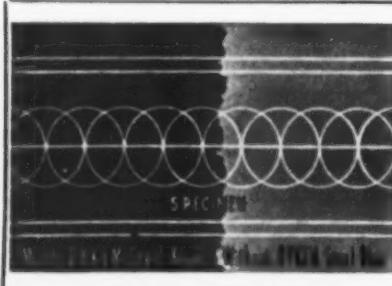


Fig. 5—Setup for ejecting finished parts from circular dial with special pick-off arm. View at left shows position of pick-off arm before being released by press slide for ejecting finished work from dial. View at right shows ejecting position of pick-off arm after release.

the pick-off arm after being released by the press slide.

In another installation involving a dial feed, the dial is mounted on a special bolster plate that rests on the regular bolster plate of the press. Openings are provided under the working stations for inserting dies under the

dial, similarly as with an underfed dial. The workpieces are fed into openings in the dial, and the dies must be carefully fitted in the dial bolster so that there will be no obstruction to prevent the parts from being moved freely over the dies. Sometimes it is necessary to fit a plate between the die



## DYKEM STEEL BLUE

**Stops Losses in Making Dies and Templates**

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

**THE DYKEM COMPANY**

2301F NORTH 11th ST.

ST. LOUIS, MO.

# For the FINEST Tools...

## Specify



TOOLS... BLANKS... WEAR PARTS... DIES...

TELEPHONES: FACTORY and BRANCHES

BALTIMORE  
Plaza 3-200

BIRMINGHAM  
4-3611

BOSTON  
Decatur 2-2332

BUFFALO  
Delaware 7434

CHICAGO  
Ambassador 3-1600

CINCINNATI  
Redwood 2533

CLEVELAND  
Cherry 1-0277

DALLAS  
Riverside 5138

DAVENPORT  
7-9544

DENVER  
Tabor 0444

DETROIT  
University 4-6400

FORT WAYNE  
Anthony 4431

HARTFORD  
32-5197

HOUSTON  
Wayside 1530

INDIANAPOLIS  
Riley 3946

KANSAS CITY  
Baltimore 1700

LOS ANGELES  
Richmond 4682

LOUISVILLE  
Taylor 5960

MILWAUKEE  
Division 2-0204

MINNEAPOLIS  
Bridgeport 2792

NEWARK  
Mitchell 2-0327

NEW YORK  
Flushing 3-0227

PRORIA  
Enterprise 3151

PHILADELPHIA  
Gladiators 5-6500

PITTSBURGH  
Hiland 1-6548

READING  
Enterprise 1-6611

ROCKFORD  
Enterprise 2864

ST. LOUIS  
Norwood 3110

SAN FRANCISCO  
Vulcan 6-6505

SCRANTON  
Enterprise 1-0531

SEATTLE  
Elliot 0032

SYRACUSE  
3-0334

WAUKEGAN  
Ontario 1229

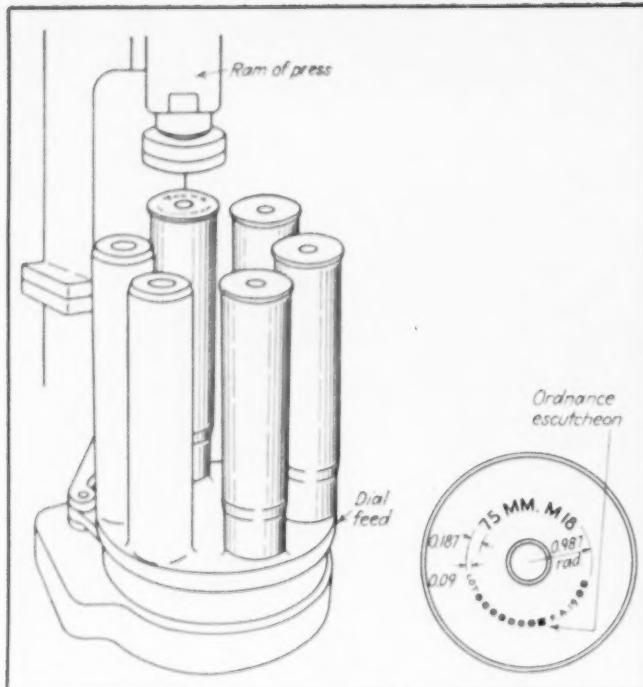


Fig. 6—Drawing of dial-fed press for stamping cartridge cases.

station where they are dropped through a hole in the bolster.

After the cartridge cases have been finish drawn, they are annealed, cooled, and stamped ready for packing and shipment. Stamping is performed on a dial-fed press as illustrated in Fig. 6. Numerous examples of work performed on circular dial feeds can be found

and bolster to obtain free movement of the work. This type of feed is suitable for drawing cartridge cases, broaching small work, and piercing and trimming operations. In this type of dial, the parts are usually pushed through the dies, although in some cases they are carried to a subsequent

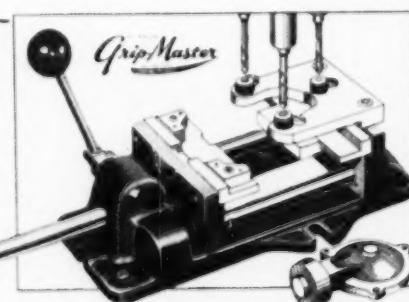
in "Die Engineering Layouts and Formulas" and "Pressworking of Metals" published by McGraw-Hill Book Company, New York, and edited by the author.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

## HAVE TO CUT COSTS? THIS SCREWLESS VISE CAN SAVE YOU UP TO 75% ON TOOLING COSTS

*Extra time and labor savings in production work can be yours when you use Heinrich "Grip-Master," the original screwless vise. Instantly adjustable; has positive lock that hammer blows cannot break. No leveling of work necessary. Ideal as a base structure for jigs and fixtures. Write for free folder or ask your Dealer for a demonstration.*

**NATIONAL MACHINE TOOL CO.**  
Dept. 110 M., RACINE, WISCONSIN



**BARNESDRIL**  
No. 4 MAGNETIC  
COOLANT  
SEPARATOR

**SAVES \$104.42 PER WEEK**

**FEWER WHEEL DRESSINGS**

**EASIER CUTTING ACTION**

**IMPROVED WORK FINISH**

**LESS TOOL RECONDITIONING**

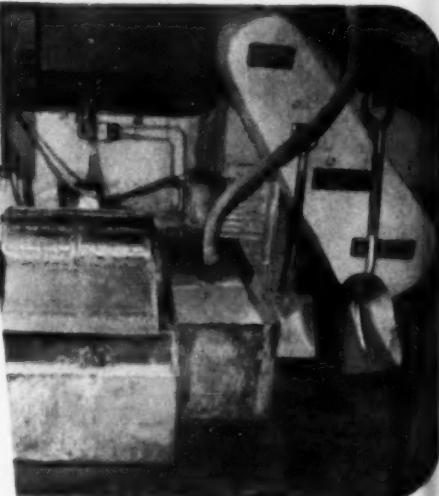
**CALCULATED SAVINGS PER WEEK**

Cost Without  
SEPARATOR

Cost With  
SEPARATOR

MACHINE PRODUCTION LOSS	\$2.25
\$86.00	
OPERATOR PRODUCTION LOSS	.56
16.50	
CLEANING COSTS	.41
12.10	
COOLANT COSTS	1.06
14.10	
<b>\$108.70</b>	<b>\$4.28</b>

**SAVINGS PER WEEK — \$104.42**



on No. 3 Cincinnati Centerless Grinder

**BARNESDRIL** Magnetic Coolant Separators save money. Compare these operating, cleaning and coolant costs listed in the adjoining table. Besides the actual dollars saved, production savings are also made in wheel life, cutting action, tool repair and quality finishing. Similar real savings can be made in your shop with this modern sludge removal method. Telephone a **BARNESDRIL** Engineer today for the complete story.



**Free** Catalog and additional Data Sheets:  
Check the savings that can be made on your  
Grinding, Honing, Shaving or Shaping Operations.  
Get a Copy now. Ask for Bulletin B300E.

**B A R N E S   D R I L L C O .**

650 CHESTNUT STREET ROCKFORD, ILLINOIS U.S.A.

# Trimming Body Skins of Stratojets



By HOWARD E. JACKSON

THE body skin of a B-47 Stratojet, the 600 mph bomber manufactured by the Boeing Airplane Company of Seattle, Washington, is made of 75S-T duralumin which varies in thickness from 0.032 in. to  $\frac{5}{8}$  inch. A tolerance of 0.015 in. is permitted where the sections that go to make up the skin are joined together. Practically all known methods of trimming the dural sheets were tried but none appeared to meet the necessary requirements. Even the lowly tin snips was tried but this method was found unworkable on two counts. In the first place, it was difficult to maintain the tolerance demanded on this job, and second, it was impossible to cut through the thicker sections of dural.

Some of the previously used methods of trimming the dural sheet were satisfactory when the specifications for joining the sections called for lapped joints; however, the specifications

for the body skin of the Stratojet calls for butt joints and thereby makes it necessary to use a more accurate method of trimming in order to meet the allowable joint tolerance.

The tool engineering department was asked to produce some sort of cutter, the mounting of which would be flexible in the cutting plane, slightly rotatable in the vertically-perpendicular plane, but absolutely rigid in the plane horizontally perpendicular to the cut. The engineers had many problems to solve in order to produce the special saw; it had to cut almost, but not quite, through dural up to 0.25-in. thickness.

There were other problems, such as getting a circular saw blade whose teeth would not gum up with dural. A powerful yet small motor had to be used, for the saw could not be too heavy for one man to handle with ease. Finally, it had to be rugged enough to

Fig. 1—New skin saw is held by horizontally-mounted wheels riding edge-slotted flat track; track in turn is held to skin by suction feet; air motor operates the saw.

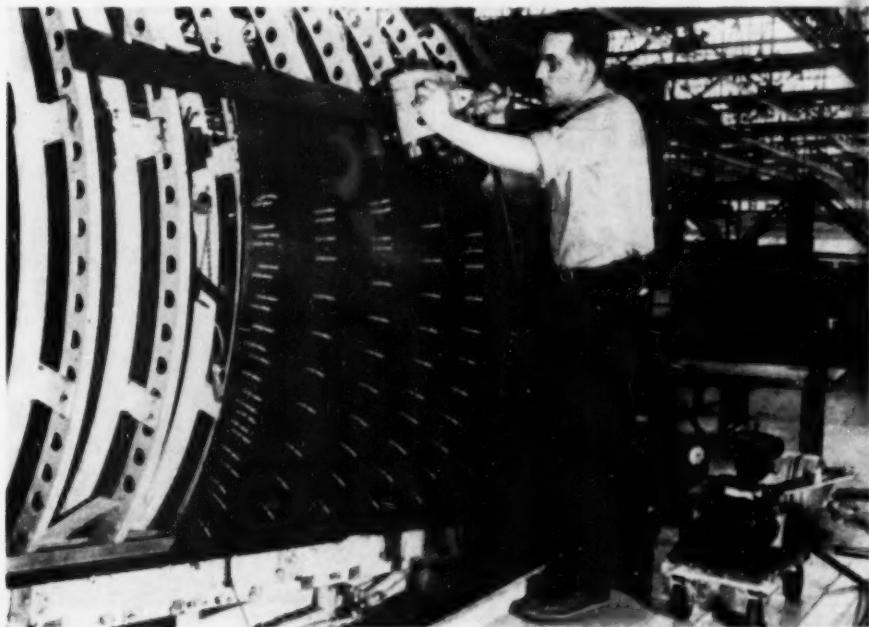
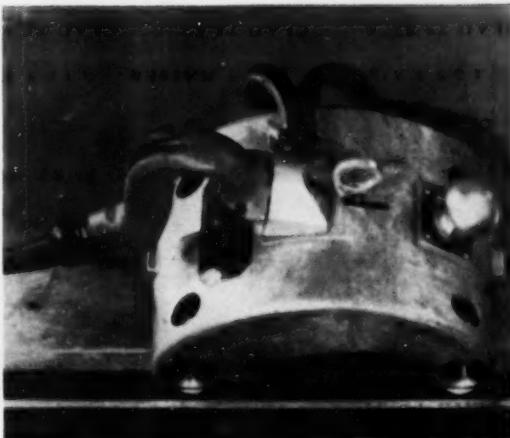
stand up under a day-after-day grind on the assembly line without any loss whatever in precision.

Most of these hard-to-fill requirements arose because of the well-nigh revolutionary sequence in which this saw was to be used. With it, the skin would first be riveted permanently to the airplane frame and then precision sawed. This wasn't putting the

cart in front of the horse; it was avoiding the need for using a horse at all.

The requirements were met; the

Fig. 2—Mechanic saws edge of first sheet of B-47 body skin. Second skin will be lapped, tack-riveted, sawed, then fully riveted. Pump behind mechanic supplies suction for saw track.



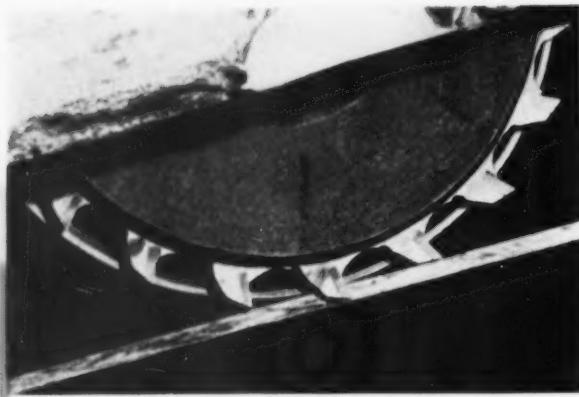


Fig. 3—Close-up of trimmer saw, side view showing cutter.

problems overcome. The result is a 17-lb. saw that runs on a flexible steel track, its blade set with tungsten-carbide teeth and driven by a  $1\frac{1}{2}$  h.p. air motor. The steel track may be integrally fastened to a jig, or it can be wrapped onto the cylindrical surface

of the B-47 fuselage and held there during a cutting operation by broad-based neoprene suction cups. These cups, incidentally, also were designed by Boeing tool engineers and are manufactured at Boeing.

The lateral accuracy of the saw cut is controlled by the rigidity, in that direction, of the flexible steel track. Depth of the cut is regulated by a gauging wheel whose edge rides on the skin about  $1/6$ -in. to one side of the saw blade. This wheel turns on a

# TESTING?

You Need the  
**ACRO-MARKER**

Reg. U.S. Pat. Off.

TO STAMP THE TAGS THAT  
RECORD YOUR FINDINGS.

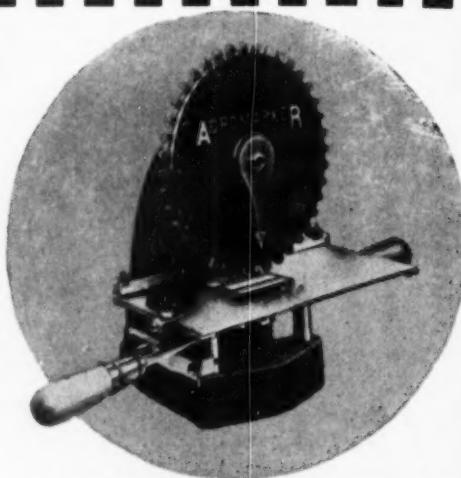
"Thousands are in use for stamping name-plates, tools, machine parts, dials, instrument parts, signal system tags, tool checks, etc."

ORDER YOURS NOW

Price of Model  
No. 1 Illustrated.  
ONLY . . . . .

'The Original Marking Specialists'

\$187.50



# ACROMARK

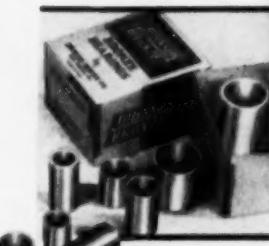
9 Morrell

Elizabeth 4, N. J.

# THIS CATALOG helps you order Bearings



OVER 90% of your sleeve bearing needs are listed in this Johnson Bronze catalog . . . and are stocked by your local Johnson Bronze Distributor. Keep your copy near. Refer to it when you need bearings and bushings. There are over 850 sizes of GP (General Purpose) Bearings listed by inside diameter, outside diameter, and length . . . you can order by catalog number. The same applies to over 200 sizes of Graphited Bearings, more than 300 different Electric Motor Bearings, over 350 sizes of Universal Bronze Bars, and two types of Babbitt Metal. In an emergency, look up the item you need and phone your Johnson Bronze Distributor. He has it in stock and can make immediate delivery.



If you do not have  
the latest Johnson  
Bronze Catalog, write today  
for your copy.

**Johnson Bronze**  
SLEEVE BEARING HEADQUARTERS  
590 SOUTH MILL STREET • NEW CASTLE, PA.

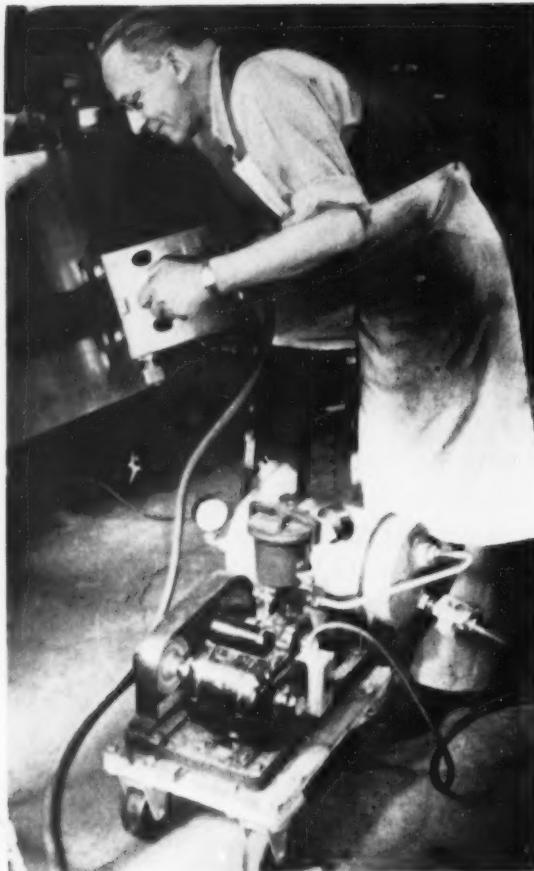


Fig. 4 — Setup shows how semi-flexible track holds tightly to skin. Depth of saw cut does not depend upon track; it is gauged micrometrically by means of an eccentric wheel which is located alongside the saw.

Just now going into production on B-47 body sections, the new saw saves countless tedious hours of labor—but that was not the main reason for building it. Without such a saw you could produce one, two, or a handful of airplanes whose skins are covered with 0.015-in. tolerances, by using highly-skilled mechanics to trim the skin edges and fit them. But if you want to build such airplanes in quantity, you can't find enough skilled mechanics to do the job. Not just economy, then, but stark feasibility was involved. The trim saw may make similar production feasible in other industries.

bushing whose bore revolves on the saw-blade shaft, but whose outside bearing surface is eccentric to that shaft.

The cutting depth of each saw is carefully adjusted, and locked, so that it will cut to within approximately .005-inch of the thickness of the skin upon which it is used. The saw teeth are ground at a slight bevel. After sawing, the waste portion tears off just like the lid of a coffee can. No "knife" edge is left; no deburring is necessary.

**Wage Supplements.** Prepared by Economic Research Dept., Chamber of Commerce of the United States of America, Washington 6, D. C. 16 pages. Heavy paper covers. Price: single copy, 50 cents; discounts for larger quantities.

This report on non-wage labor costs and labor income is based on 1949 reports received from 690 companies. It covers manufacturing, finance, wholesale and retail trade, and other sectors of the economy.



# Ten thousand teeth

*and every one a working tooth!*

A FILE with a lot of its teeth shorter than their neighbors is about as efficient as a farmer's harrow with some of its spikes missing. . . . It just can't do a good job, can't do as much work, can't give you your full money's worth.

Because short teeth in a file can't reach the work, they are almost totally useless. And chances are they're not sharp even after the higher teeth have worn down to their level.

Uniform height and sharpness of file teeth are largely a matter of file-cutting precision—an important manufacturing detail in which Nicholson file-cutting

machines are considered tops. Squint your eye along the working surface of a Nicholson or Black Diamond file and note how completely Accuracy is in the saddle.

But what you can't see, but still is there too, are the toughness and uniform hardness of those teeth. EXTRA QUALITY "GRADE A" is the banner under which these world-famous files come to you through your industrial distributor.

**FREE BOOK "FILE PHILOSOPHY"**—18 interesting, informative, illustrated pages on the manufacture, kinds, use and care of files. Available to executives, purchasing and production heads, key mechanics. Send for it.



NICHOLSON FILE CO., 48 Acorn St., Providence 1, R. I.

(In Canada, Port Hope, Ont.)



## NICHOLSON A FILE FOR EVERY PURPOSE



*For Guaranteed Quality-Proved Economy!*

Made of finest high-speed steel in standard and special sizes from  $\frac{1}{8}$ " to  $1\frac{1}{4}$ " body diameter.

Full information is contained in Circle R's Catalog M, available on request.



**CIRCULAR TOOL CO., INC.**

PROVIDENCE 5, RHODE ISLAND

CHICAGO • CLEVELAND • DAYTON • DETROIT • INDIANAPOLIS

LOS ANGELES • MILWAUKEE • NEW YORK CITY • PHILADELPHIA

PHOENIX • PITTSBURGH • PROVIDENCE • ROCHESTER • ST. LOUIS

# TUKON

for Micro-Indentation  
Hardness Testing

Wilson now offers 3 models for use with either Knoop or 136° Diamond Pyramid Indenter.

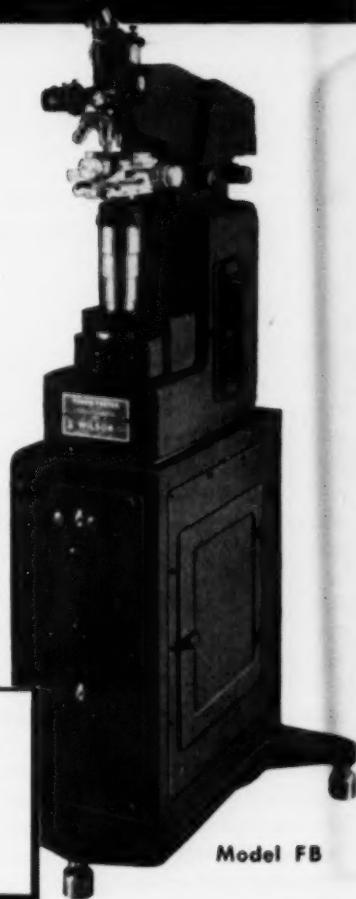
**Model MO**—Mechanically operated—simple, economical. Bench or floor type. Applies loads from 1 to 1000 grams.

**Model FB**—Fully automatic—most popular model. Applies loads from 10 to 3600 grams.

**Model LR**—“Long Range” model—the ultimate in hardness testing. Applies loads from 10 to 50,000 grams.

**SEND FOR  
BULLETIN OF INFORMATION**

Made by WILSON, manufacturer of “ROCKWELL” Hardness Testers and “ROCKWELL” Superficial Hardness Testers.



**WILSON**  
MECHANICAL INSTRUMENT CO., INC.  
AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

230-G PARK AVENUE, NEW YORK 17, N.Y.



# Equipment Plus Technique Speeds Wheel Turning Job

**Southern Pacific develops turning technique for re-turning wheels of rail-borne vehicles.**

By BARTLETT WEST

THROUGH the development of an unusual turning technique, Southern Pacific Company's Los Angeles Shops are currently re-turning wheels for railroad cars, diesels, tenders, and so on, in half the amount of time that would normally be required for such operations. The wheels of rail-borne vehicles must be periodically re-surfaced by means of turning because the continual pounding of heavy operational loads thereon invariably results in a concavity in the wheel treads and other defects such as brake burns and flat spots due to slippage—all of which can cause untold thousands of dollars' worth of damage if the discrepancies are allowed to progress beyond a certain stage without being corrected. Therefore, the subject re-turning work can be regarded as a mass-production as well as a service operation.

Prior to the development of the new turning technique, Southern Pacific's wheels were re-surfaced by means of lathe equipment geared to a top speed of 2 r.p.m. with a feed of  $\frac{1}{4}$  inch. High-

speed-steel cutting tools were used, and the operational sequence was in general as follows:

(1) An operator made a rough cut on the tread section of the wheel to remove the bulk of the unwanted material.

(2) Excess material on the flange section was removed from each wheel with a second rough cut.

(3) A forming tool was used to cover both of the above-mentioned areas in taking a light cut for a fairly-smooth finish.

(4) A chamfer was formed with a final cut which removed only a slight amount of material.

The latter steps, combined with available lathe operational speeds, necessitated approximately an hour and 20 minutes of time for the machining of each pair of wheels, or about six pairs of wheels per lathe daily. To increase this rate of production, company officials decided it would be necessary to purchase new lathe equipment in order to make use of carbide

cutting tools, since available lathes were not geared to the speeds which were essential to the efficient use of carbides.

The practicability of this idea was tested after the company purchased a new 52-inch lathe, as shown in Fig. 1, which is equipped to provide for a gen-

eral purpose machine. The main drive is located within the left headstock housing, which is rigidly bolted to the bed, and a power traverse mechanism operated by means of a separate motor is provided for the right headstock, which is slidably mounted on the bed. Forward movement via a friction disk eliminates the possibility of lathe

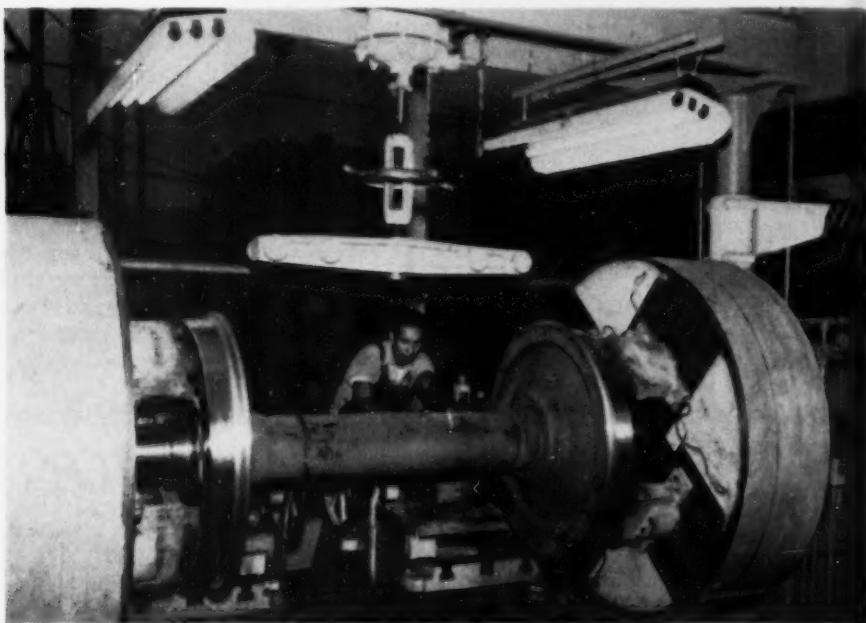


Fig. 1—Illustration showing new 52-inch lathe designed for use in the re-turning of rail car wheels.

erous reserve of strength and power for the heavy-duty use of carbide tools at speeds up to 24 r.p.m. Variable spindle speeds now make it possible to use the lathe with high-speed-steel tools as well as carbides, and a pair of massive heads mounted on a wide and sturdy bed facilitate the use of the tool as previous lathes were used—that is, for the simultaneous machining of two wheels.

The main drive gearing for the new

damage due to excessive force in the operation of the headstock, while backward movement is governed by an electrical limit switch. A pneumatic clamp secures the headstock in fore and aft positions, respectively, and renewable hardened steel wear plates are attached to the ways of the bed under the right stock.

The underside of the T-slots are lined with steel plates, and pneumatic driver dogs permit the use of air pres-

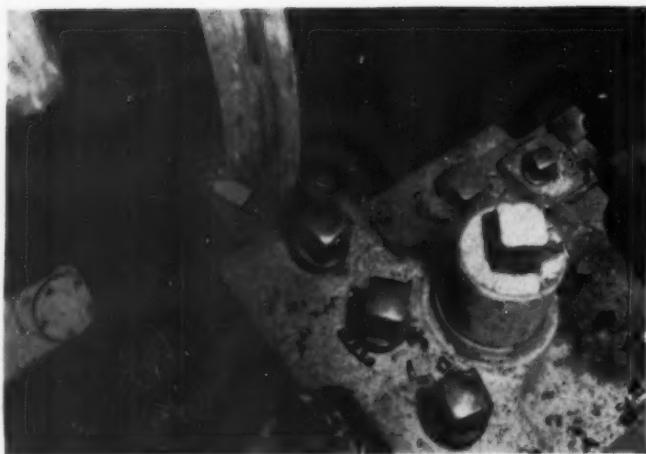


Fig. 2—Closeup view of tool holder, tool and workpiece. The use of carbide tipped tools permits the use of turning speeds up to 24 r.p.m. as compared with a previously used maximum speed of 2 r.p.m.

sure in holding serrated jaws in an open position, against spring pressure, so that spring pressure alone can be used to move the jaws along an angular surface to bring the jaws in contact

with their respective wheel surfaces. The springs are preloaded to a pressure greater than that required between the serrated jaws and the wheels to drive the wheel sets, so that wedge action between the jaws and their seats provides for the tightening of the driving grip as the cutting

## HIGH SPEED PRODUCTION CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

*Ask For Descriptive Booklet And See  
How You Can Improve Your Production.*

**WICACO**  
MACHINE CORPORATION

SINCE  
1868

WAYNE JUNCTION, PHILA. 44, PA.

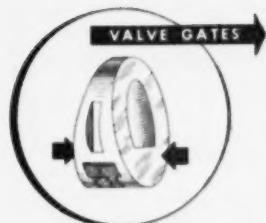
Manufacturers of

Precision Machinery and Machine Parts

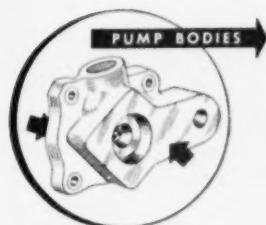
Roller Bearing Twister Spindles—Spindle Oiling Machine

Precision Internal Grinder — Screw Machine Products.





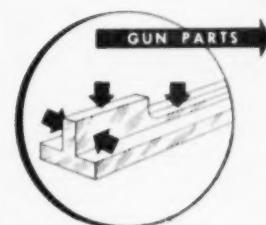
VALVE GATES



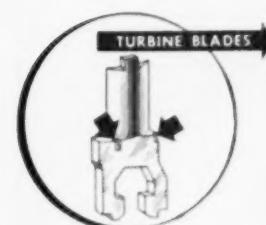
PUMP BODIES



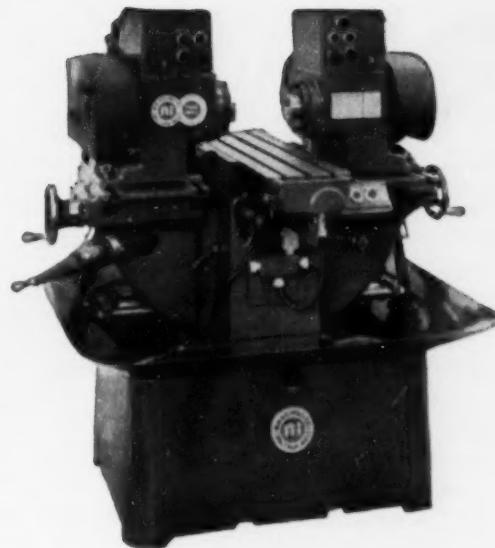
HEX NUTS



GUN PARTS



TURBINE BLADES



## on the NEW *Nichols* TWIN MILL

The TWIN MILL cuts milling costs in half on many jobs. It handles **TWO** milling operations at a time, yet requires but **ONE** fixture and **ONE** operator. Designed for the class of work usually assigned to Hand Millers or light Automatic Production Millers, the Twin Mill's speed, accuracy, and exceptional flexibility add up to increased output at lower cost. New Spindle Retraction automatically withdraws cutters at the end of each cutting stroke. New Spindle Brakes act instantly after cycle is completed. The Two Milling Heads are independent units with individual motor drives, quickly adjusted UP or DOWN, IN or OUT, or OFF-SET longitudinally. Machine handles short run or long run work economically. Automatic table cycle and entire machine push-button controlled. Write for details.

### CONDENSED SPECIFICATIONS

Table, working surface	8½" x 30"
Table, travel—cutting stroke	11½"
Motors	(two) 1 HP
Maximum height center of spindle above table	11½"
Maximum offset of spindles (horizontal)	8½"
Maximum distance between spindle noses (across table)	18"
Floor space required	64" x 56"
Spindle Speeds (15)	from 55 to 2050 R.P.M.

Manufactured by W. H. Nichols Co., 48-H Woerd Ave., Waltham 54, Mass.

Have you seen the new Nichols' movie,  
"The Miller That Uses Its Head"? It's  
available for showing in your plant.



Also available are NICHOLS Head  
Millers, NICHOLS two-spindle millers  
with identical or opposed spindles,  
and with or without pneumatic feed.

Please address inquiries to

**NICHOLS-MORRIS CORPORATION**

Dealers in Principal Cities

50-H CHURCH ST.  
NEW YORK 7, N.Y.

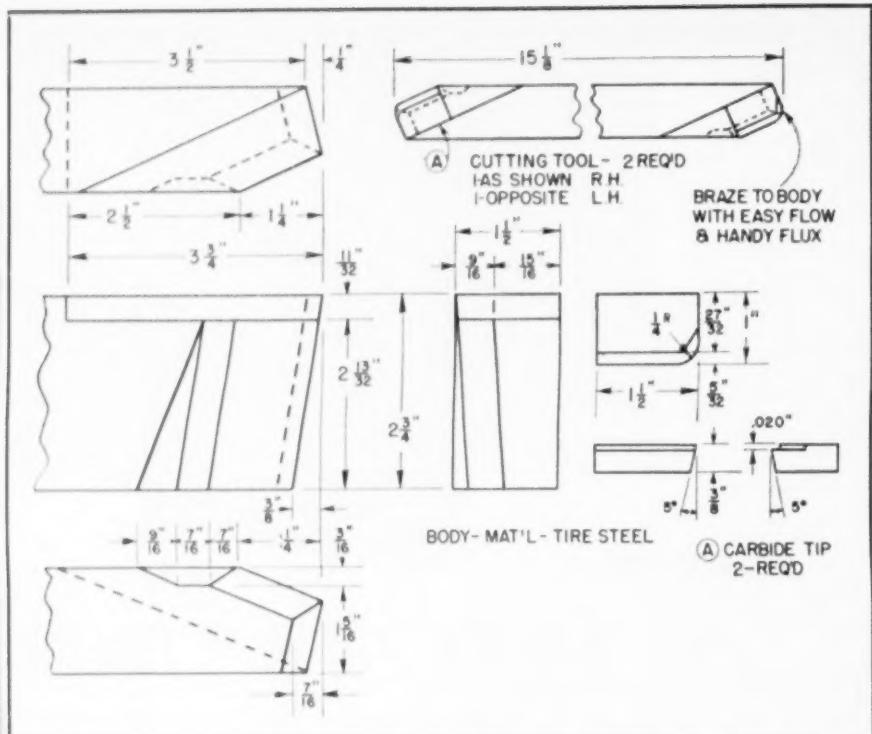


Fig. 3—Drawing of cutting tools which have been developed especially for use in the re-turning of rail car wheels.

forces increase; and, incidentally, a cushioning effect is consequently obtained against excessive loads that might be due to wheel misalignment or the like.

"In placing the machine in operation," recalls W. J. McHugh, Southern Pacific shop superintendent, "we realized that to achieve the highest possible production it would be necessary

**FOR REMOVING BROKEN TAPS\***  
**QUICKLY . . .**  
**INEXPENSIVELY . . .**  
**\*WALTON**  
**TAP EXTRACTORS are the TOOLS**  
**THE WALTON COMPANY**  
**HARTFORD 10, CONNECTICUT**



• • • • •

# M'CROSKEY

## *Adjustable Blade*

### REAMERS..

• • •



• You'll produce more pieces—better—in shorter time with McCrosky Adjustable Blade Reamers. Their heat toughened alloy steel bodies, the special heat treatment given the blades, and the ground threads on the bodies and adjusting collars, assure unsurpassed performance, efficiency and accuracy.



McCrosky reamers cut freely without chatter. They avoid any tendency to "dig in," and produce absolutely round, accurately dimensioned holes. Blades can be released easily—and adjusted and reground quickly and accurately, saving time and increasing output.

Machine chucking and shell designs. High speed, cast alloy or carbide tipped blades. *Let us quote on your requirements.*

Bulletin No. 18-R { Gives full details  
Send for a copy



**M'CROSKEY**  
TOOL CORPORATION  
MEADVILLE, PA.

**Jack-Lock® MILLING CUTTERS**  
**Adjustable BLADE REAMERS**  
**Quick-Change CHUCKS**  
**Turret TOOL POSTS**  
**Block Type BORING BARS**  
**SPECIAL Multiple Operation TOOLS**

to use carbide cutting tools; but, since we were not using the profiling attachment with which the new lathe could be equipped, this presented some problems. However, as a first step we had our tool design engineer experiment on the correct design and shape of carbide tool for use in turning the tread section of a car wheel."

After appropriate cutting tools were developed, as indicated in Fig. 3, it was learned that spindle feeds of 12 to 15 r.p.m., depending upon the quality of the metal and the depth of the required cut in each case, enabled the carbide cutters to produce a smoother finish in one operation than had pre-

viously been attained in two cutting operations.

At this writing, high-speed-steel cutters are still being used for flange and chamfer operations, due to a lack of satisfactory profiling equipment and a consequent need for specially-designed carbide tools. However, carbide tools are being evolved at an accelerating pace and it is expected that their use will boost production by an additional margin of 50 per cent.

The figures from a time chart on the turning of a 90-ton tender wheel, the largest and heaviest of all car wheels, represents a concrete example of increased speed that has been attained

EFFICIENT - LOW COST  
PRODUCTION

O. B. I. PRESS

HORN PRESS

DEEP THROAT

ROUSSELLE

PUNCH  
PRESSES

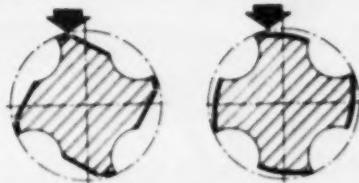
WRITE FOR  
DETAILS

7633  
S. Ashland Ave.  
Chicago 20

SERVICE MACHINE COMPANY

# **PROVED!**

**Radial Relief Grinding gives up to  
500% greater tool LIFE as result  
of better support  
at cutting edge**



ANGULAR RELIEF RADIAL RELIEF

Available in hand operated and  
motor driven models for tool room  
or production use.



Now, D.S. has simplified Radial Relief grinding. Made it a job for any good grinder hand by eliminating complicated set-up and computations. Grinds taps, center drills, reamers, counterbores, etc., one to 14 flutes.

D. S. GRINDER DIVISION  
ROYAL OAK TOOL & MACHINE CO.  
621 E. Fourth St., Royal Oak, Mich.

Gentlemen:

Please forward your D. S. Catalog.

Name \_\_\_\_\_

Address \_\_\_\_\_

City and State \_\_\_\_\_

through the use of carbide tools for tread-turning purposes alone:

Set-up time ..... 4 min.

Tread-cutting time .....  $11\frac{1}{2}$  min.

Flange-cutting time .....  $17\frac{1}{4}$  min.

Chamfer-cutting time ..... 4 min.

Unloading time ..... 3 min.

Total time ..... 40 min.

Increased usage of carbide tools is

expected to reduce the time required for flange and chamfer cuts, respectively, to 6 and 1 minute intervals.

As heretofore intimated, time requirements vary according to the work that must be done in each circumstance; but it is believed that further savings can be achieved in the form of reduced set-up time as the result of a current operator-training program. For example, it has been learned that operators who understand the significance of the chip colors produced with carbide tools can regulate feed speeds with optimum efficiency simply by reducing speeds when chips have a bright amber color until a deep blue chip (denoting normal speed) is attained in each cutting operation.



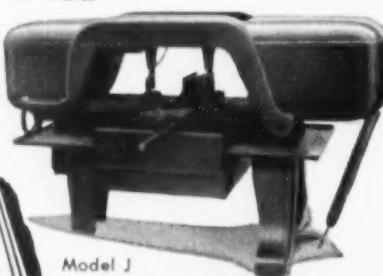
*It's*  
**TWIST-PROOF!**

**RIGID BOX-TYPE  
FRAME MODEL J**

**JOHNSON METAL CUT-OFF BAND SAW**

The wheel assemblies are mounted on welded steel brackets which are bolted high on the frame; opposing forces due to blade tension are transmitted through solid metal. It's twist-proof, one of its many advantages. Accurate, speedy, dependable, inexpensive. Reduces your metal cut-off costs. Heavy, Sturdy. Cuts 10" rounds, 18" flats.

Also MODEL B, lighter, portable, rigid; cuts 5" rounds, 10" flats.



*Write for  
CATALOG!*

**JOHNSON MANUFACTURING CORP.  
ALBION, MICHIGAN**

LET'S QUIT MONKEYING AROUND  
WITH INADEQUATE TOOLS. BUY THE BEST-  
BUY SHIELD BRAND.



... and you, too, can do it faster, better and at less cost with a Standard Red Shield Drill. No matter what you have to drill—iron, steel, brass, copper, aluminum, plastic—we have a Shield Brand Drill especially made for the job.

Shield Brand Drills—like all the Shield Brand Tools—are Foremost Quality in design, construction, workmanship. Our Service Men have the benefit of over 69 years' accumulated experience in solving tough drilling, reaming and metal cutting problems. Their advice and suggestions are gladly given *without cost or obligation*. Leading Industrial Supply Distributors coast to coast will look after your requirements for Standard Shield Brand Tools.



**STANDARD TOOL CO.** CLEVELAND 4, OHIO

New York • Detroit • Chicago • San Francisco

THE STANDARD LINE: Drills • Reamers • Taps • Dies • Milling Cutters • End Mills • Nibs • Counterbores • Special Tools





Star Molyflex Blades eliminate the biggest fault of high speed hack saw blades. They're completely shatterproof and unbreakable in a frame. That's true no matter how tough the job may be.

And Molyflex leads the field in cut-ability. Tests prove that Molyflex Blades cut 23.8% better than the average of 8 leading brands of high speed flexible blades.



Your Star Supplier stocks the complete Star line of hand and power hack saw blades, frames and bands.

He also has the handy Star Wall Chart and the useful 32-page booklet, "Metal Cutting". Both are packed with valuable information on blades and cutting techniques. Get your copies today. They're FREE.



just below the lowest point of wear on each wheel, it is believed that wheels will hereafter be good for many thousands of miles of additional service.

Higher operational speeds than those heretofore mentioned could be used in re-turning wheels with carbide cutters, but have been reduced somewhat in order to eliminate the need for coolants and related difficulties—such as the contamination of oils in lathe circulating systems, fractures due to uneven cooling, and so on. Where it is impossible to avoid overheating through the use of moderate operational speeds, Southern Pacific officials contend that compressed air alone has been quite satisfactory as a cooling medium.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.



investigate

# Surface Broaching

## for difficult machining work



- Throughout the metal working field there are many parts that can be surface broached at remarkable savings over the costs of the present machining method. The aircraft, automotive, small tool, appliance and even sporting goods manufacturers have all found ways of making parts faster, cheaper and to finer tolerances through the use of Footburt Surface Broaching Machines. We will be glad to work with you on the application of surface broaching.



Duplex Surface Broaching  
Machine. Made in 5, 10,  
15 and 25 Ton Sizes.



Single Slide Surface Broaching  
Machine. Made in 5,  
10, 15 and 25 Ton Sizes.



Continuous Type Broaching  
Machine. Made in 4  
Sizes.

THE FOOTE-BURT COMPANY  
CLEVELAND 8, OHIO

Detroit Office: General Motors Building

# FOOTBURT Surface Broaching

a time tested line of machine tools

# Lower Your Carbide Grinding Costs

with

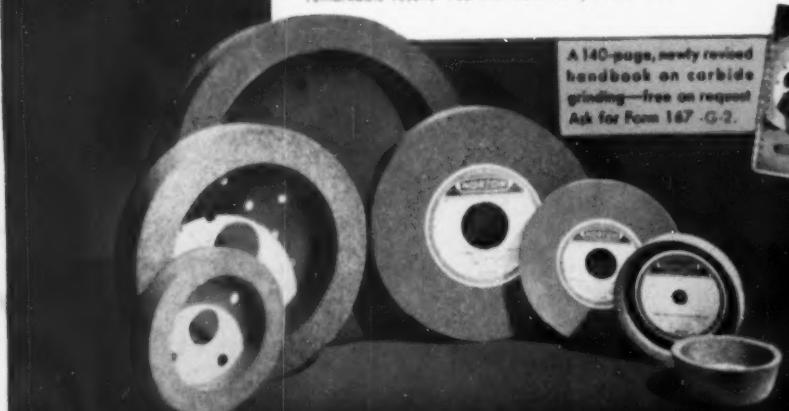
## CRYSTOLON WHEELS in the New K-Bond

A faster and freer cutting action combined with greatly increased uniformity in grinding action — this is what you get with the new Norton K-Bond, a new vitrified bond for CRYSTOLON grinding wheels both green and gray. The high rate of stock removal and the cool cutting action of the new K-Bond speed up the grinding operation and help eliminate spoiled tools — thus they reduce the over-all grinding costs.

Also, the Norton K-Bond has brought about a new standard of uniformity to vitrified bonded silicon carbide wheels. These products can now be controlled to such a degree of accuracy as to make it possible to produce wheels of half grade increments of hardness. Thus Norton wheel specifications can be "pin-pointed" to suit the individual requirements of your carbide grinding jobs.

In plant after plant, the new K-Bond CRYSTOLON wheels are showing remarkable results. You will want to try them, too.

A 140-page, newly revised handbook on carbide grinding—free on request.  
Ask for Form 167-G-2.



Making better products to make other products better

by following the **NORTON** way

with

## DIAMOND WHEELS

*in Vitrified, Resinoid,  
and Metal Bonds*

FOR the plant that is grinding carbide tools in any appreciable quantity, diamond wheels are unquestionably the most economical because of their faster cutting action and longer life. And with Norton diamond wheels this is especially true because the three types of bond make it possible to supply exactly the right wheel — the most economical wheel — for each job.

**Vitrified Bond** — combining a fast cutting action with long life it is outstanding for sharpening single-point tools. It is also popular for chip breaker wheels  $\frac{1}{2}$ " or more thick.

**Resinoid Bond** — first choice for all fixed feed operations such as surface and cylindrical grinding and the sharpening of multi-tooth cutters; also used for thin chip breaker wheels.

**Metal Bond** — used for sharpening single-point tools when maximum wheel life is the first consideration; also in cut-off wheels for cutting carbide blanks.

W-130E

**NORTON**

ABRASIVES



# *Avey* BMA-6 TOOL ROOM DRILL

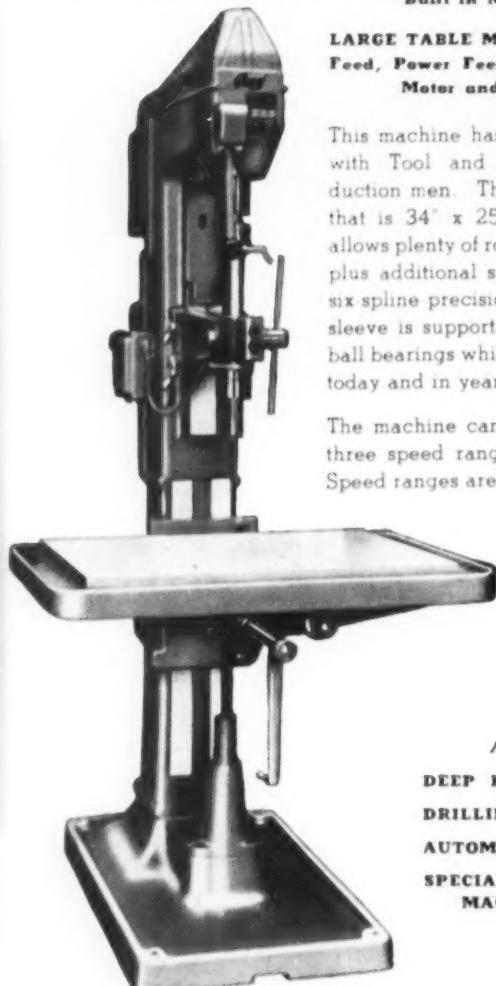
Built in No. 2 and No. 3 Sizes

LARGE TABLE MACHINE having either Hand Feed, Power Feed, Avey-Matic or Reversing Motor and Control for Tapping.

This machine has proved to be very popular with Tool and Die Shop men, also production men. The large heavily ribbed table that is 34" x 25", plus ample chip trough, allows plenty of room for large dies or fixtures, plus additional space for tooling, etc. Each six spline precision ground spindle and drive sleeve is supported by five rows of precision ball bearings which give the precision needed today and in years to come.

The machine can be obtained with either of three speed ranges: low, medium, or high. Speed ranges are easily changeable for future

jobs requiring higher or lower speeds, which is a necessity today with ever-changing design. Where power feed is desired four rates of feed are furnished.



*Also manufacturers of*

**DEEP HOLE DRILLING MACHINES  
DRILLING AND TAPPING UNITS  
AUTOMATIC INDEX TABLES  
SPECIAL DRILLING AND TAPPING MACHINES**

**THE AVEY DRILLING MACHINE CO.**

CINCINNATI 1, OHIO

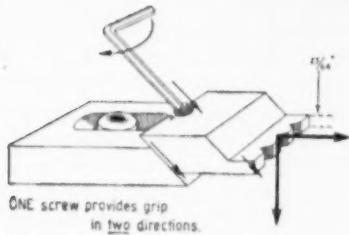
# SPEED PRODUCTION RATES

with

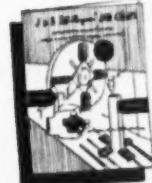
## NEW J & S JAW CLAMPS

Eliminate U-Clamps and  
Straps

Workpieces Positioned,  
Held, Removed  
with ONE screw!



ONE SCREW provides grip  
in two directions.



With jaws only  $23/64"$  thick, J & S Clamps allow overall machining to within  $\frac{1}{16}$ " of the machine's working surface! Point for point, the new clamp provides tremendous advantages over all older kinds. They are available in types and sizes to suit all applications—"T" nuts are furnished to fit all standard machines.

### WRITE FOR NEW FOLDERS!

Contains complete details on advantages, applications, types and sizes available.

J & S "All-Purpose" Jaw Clamps are one of the popular J & S "Machine Shop TIME SAVERS." ("Time Saver" booklets, describing J & S "Fluidmotion" Wheel Dressers, etc., available on request.)

**J & S TOOL CO. INC.**

475 MAIN STREET  
EAST ORANGE,  
NEW JERSEY

Representatives  
in Principal Cities

# How Fisher Body Solves Some Materials Handling Problems

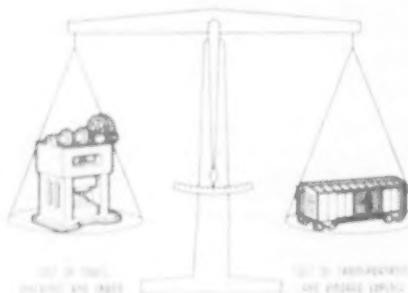
By E. R. FROST

Director of Materials Handling  
Fisher Body Division, General Motors Corporation  
Detroit, Michigan

THE coordination of Engineering and Materials Handling in the Fisher Body Division of General Motors Corporation is a "must." Basically, this coordination is necessary due to the nature of the product and to the manufacturing practices involved. The handling, storing, and shipping of component body parts and sub-assemblies requires a minimum of cubic space in addition to adequate protection through the various processing and transportation mediums used. Because of the manufacturing practices, transportation costs and protective procedures are very important factors. Fisher Body fabricates sheet steel components and sub-assemblies in seven centrally located stamping and metal assembly plants; these components and sub-assemblies

are then shipped to 21 assembly plants located throughout the United States, as shown in the illustration Fig. 1, and to some 16 similar plants in foreign countries, the latter being operated by General Motors subsidiaries.

In order to understand more clearly the problems which arise as a result of this coordination, we might first take a look at the procedure followed in the engineering of Fisher bodies. As illustrated in Fig. 2, the outline or silhouette, curves, sweeps, and contours

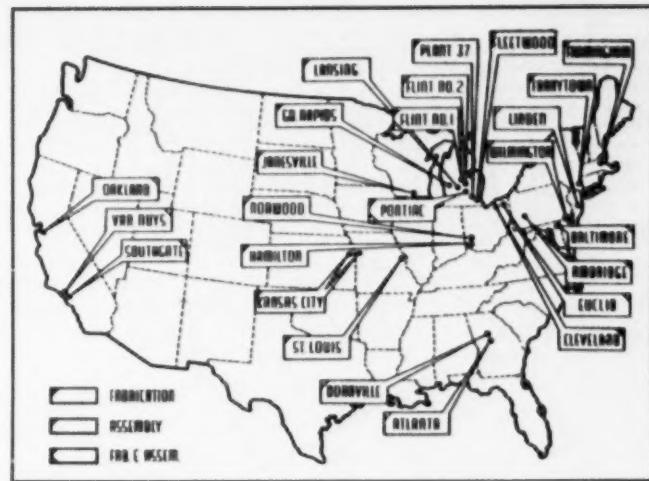


which form the design of a given body style are the result of ideas suggested by many people. Once the styling has been determined, it becomes the duty of the Engineering Division to design the interior structure—a structure which possesses the necessary stamina, comfort, and beauty to meet

Fig. 1—Map of United States showing plant locations: (a) Fabrication; (b) Assembly.

Fisher Body standards. At the same time, engineers of the Die Engineering Section start to work, since it is their function to design the dies to form the outer panels and appurtenances in exact conformance with the approved models.

Not to be outdone and knowing that their part in engineering is last, but by no means least, the engineers of the Production Engineering Section have been collaborating with the other two, working from master layouts as shown in Figs. 3 and 4. It is the job of the Production Engineering Section to design and supervise the making of tools, jigs, and fixtures which make up the complete "Body by Fisher" which must be "Better Than Ever." Body Engineering, Die Engineering, and Production Engineering work very



closely together at all times. As an illustration of the close coordination required, gas welding lines, for example, are not shown on body drawings until a conference of all three results in agreement as to where the welding joints will be placed. Materials Handling factors are given definite consideration when making such determinations.

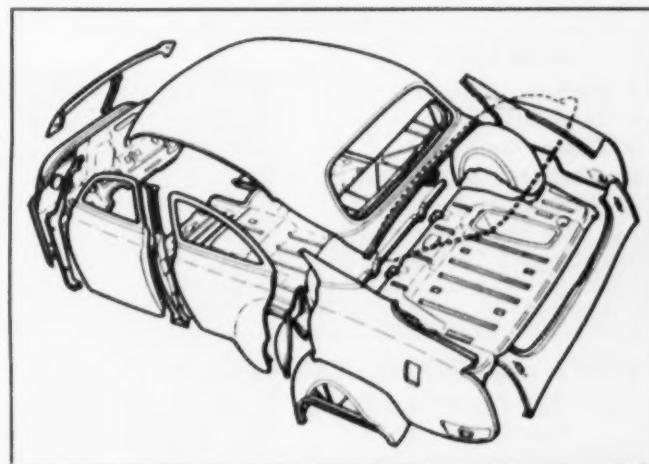


Fig. 2—Exploded view of body.

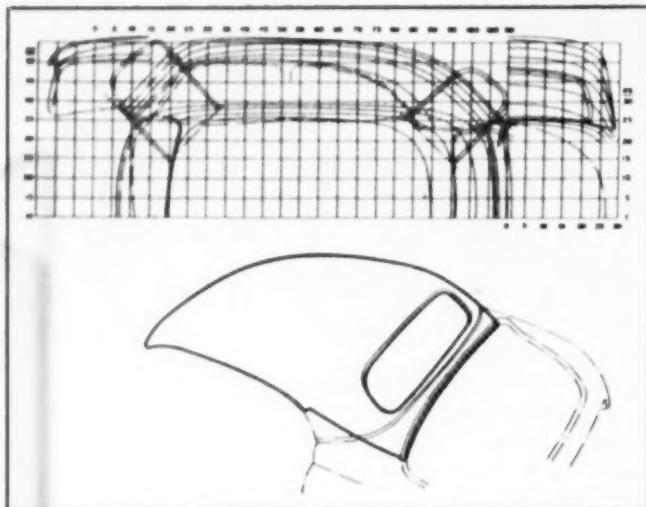


Fig. 3—Typical master layout (roof panel).

facturing, storage, shipping, and assembly, because of its effect on profits and losses. The components of an automobile body are large and bulky, and while inherently strong, are subject to dinging and denting of the formed surfaces.

Handling is especially important from the standpoint of the storage space required and the pro-

The next problem is that of handling the body parts and sub-assemblies—an important consideration in manu-

ed surfaces. Handling is especially important from the standpoint of the storage space required and the pro-

# STOP DUSTS with DUSTKOP

22 different Dustkops — 300 cfm to 10,000 cfm

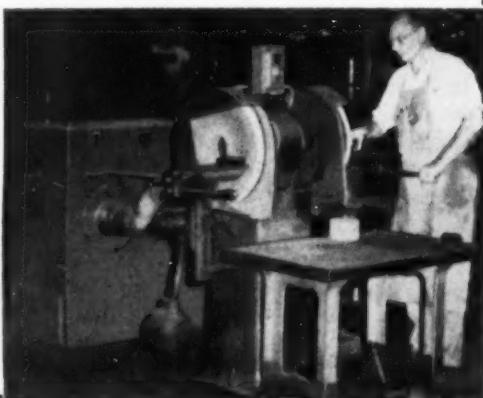
available from stock.

....dusts from,

- Surface Grinders
- Tool Grinders
- Cutter Grinders
- Abrasive Belts, Discs
- Polishing, Buffing . . .
- any industrial dusts.

Send now for new Catalog 605b.  
Describe dust problem for recommendation by return mail; no obligation.

**AGET - DETROIT CO.**  
207 Main Street  
Ann Arbor, Mich.



## DO YOU MANUFACTURE PUZZLES?

How many man hours are lost every day in your plant because metal components are not properly marked?

How much time do your customers spend trying to identify parts for re-ordering?

Are you losing good business because your components are not permanently and legibly marked for instant identification?

Would the use of modern marking equipment save you money?

Simply send prints or samples of parts to be marked, together with exact lettering and its location, for free recommendations.

### WRITE FOR CATALOG

MARKING MACHINES — ENGRAVED  
STAMPING AND EMBOSsing DIES —  
SPECIAL MARKING TOOLS — NUM-  
BERING HEADS — HAND STAMPS



## IDENTIFICATION *is your*



GEO.T. SCHMIDT, INC.

1806 W. BELLE PLAINE AVE.  
CHICAGO • 13 • ILLINOIS

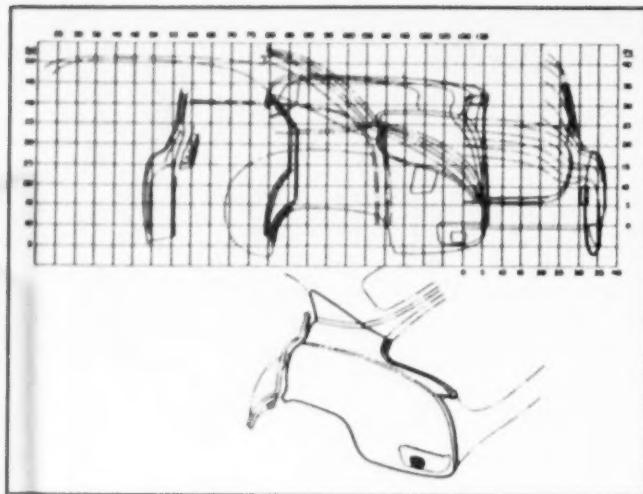


Fig. 4—Typical master layout (rear quarter panel).

5 and 6, which again, because of the size of the components, must be constructed sturdily. These containers represent an investment of vast proportions.

The weight-to-bulk ratio, as might be expected, is an important factor in the cost of transportation. Because of the size, bulk, and shape of the steel stampings and assemblies, there is the

tection that must be afforded body parts to reduce possible damage to them. This means the development of suitable containers, as shown in Figs.

5 and 6, which again, because of the size of the components, must be constructed sturdily. These containers represent an investment of vast proportions.



## Cut grinding costs . . . with rugged QUEEN CITY Grinders

Queen City Grinders are built to stand up under the heavy work that pours through the shop daily. Noted for their durability, freedom from downtime and low cost, Queen City Grinders cut grinding costs to the bone. • Order today a battery of these low cost grinders and eliminate "ganging up" around one lone grinder.

QUEEN CITY  
Machine Tool Co.  
223 E. 2nd St.  
Cincinnati 2, Ohio



**QUEEN CITY  
MACHINE TOOL CO.**

*There's a UNION twist drill  
for top performance  
on every operation!*

Whether you're working on the hardest alloy steel or softest iron . . . on such non-ferrous metals as brass, copper, aluminum, magnesium or zinc . . . on slate, marble, rubber, plastics, wood or any other non-metal . . . there's a type of Union Twist Drill that will give you tops in accurate, trouble-free, money-saving performance.

That goes, too, for a normal working pace or for high production records . . . and for every type of drilling equipment. No matter what the material or the conditions, *you're sure of best results when you specify Union!*

**SERVICE THAT SAVES YOU TIME,  
TROUBLE, MONEY**

Union Twist Drills are made in designs that cover the broadest range of operations. To aid you in choosing exactly the right type and size of drill for your particular applications—usual or unusual—your Union service man offers expert assistance. Call on him any time.

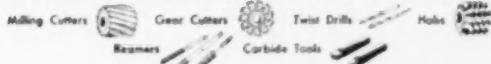
*no other twist drill  
will outperform*

*a UNION*

**contact your local distributor**

His name is listed in Union's THOMAS' REGISTER insert under "Drills, Twist."

**UNION TWIST DRILL COMPANY, ATHOL, MASSACHUSETTS**



We own and operate S. W. CARD MANUFACTURING CO.  
Division, Mansfield, Mass. Taps, Dies, Screw Plates . . .  
BUTTERFIELD DIVISION, Derby, Conn. Taps, Dies, Screw  
Plates, Reamers . . . BUTTERFIELD DIVISION, Rock Island, Ill.,  
Milling Cutters, Taper Drills, Reamers, Taps, Dies, Screw  
Plates.

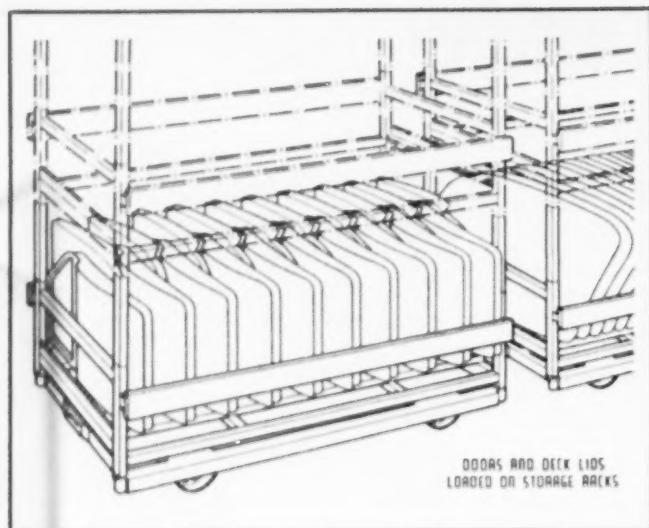


Fig. 5—Standard tubular racks loaded with panels or assemblies.

way car or truck. This means that components and sub-assemblies must be arranged to "nest", as shown in Fig. 7, with a minimum amount of air space between them, whenever it can be done without interfering

with the design or increasing the difficulty of assembly.

This "nesting" factor in Fisher Body

danger of paying for the shipment of "air," represented by the unused space between the parts packed into a rail-

*Dependable* MEASURING & CHECKING EQUIPMENT

*and Now*

**HAND WHEELS, KNOBS, HANDLES**

**Cadmium Plated**

Non-rusting — good looking

STRAIGHT and OFFSET TYPE

SOLID ROTARY MACHINE HANDLES

CAST IRON

MALLEABLE IRON

We also build jigs, fixtures, special tools and machinery. Send us your blueprints.

READY TO DELIVER

UNIVERSAL ANGLES  
In 10 sizes, ranging from 4 x 3 1/2 x 5 and up.

BOX PARALLELS  
In 15 sizes, ranging from 3 x 4 x 12 and up.

SLOTTED ANGLES  
In 19 sizes, ranging from 4 x 9 x 5 and up.

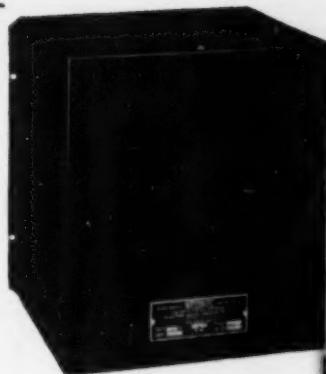
SURFACE PLATES  
Over 30 sizes, ranging from 7 x 7 1/2 to 96 x 192.  
Send for Complete Catalog

**MACHINE PRODUCTS CORPORATION**  
6771 E. McNICHOLS ROAD • DETROIT 12, MICHIGAN



**NEUTROL**  
Magnetic  
Chuck  
Controls

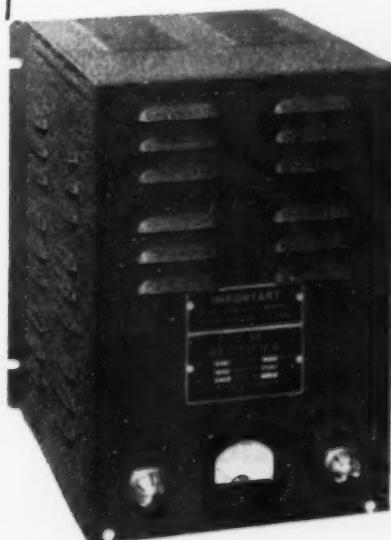
## WHEREVER MAGNETIC CHUCKS ARE USED



THE ELECTRO-MATIC RECTIFIER AND NEUTROL MAGNETIC CHUCK CONTROL ARE INDISPENSABLE FOR BETTER AND SAFER GRINDER PERFORMANCE

NEUTROL Magnetic Chuck Controls speedily release and demagnetize workpieces. With NEUTROL, there's no need to hammer or pry to release the work. This saves time and tempers—saves marred, distorted workpieces and prevents damaging of chuck faces. NEUTROL also protects chucks against harmful voltage surges.

ELECTRO-MATIC Rectifiers are sturdy, heavy duty, direct current supply units, engineered to "stand up" day-after-day in the hardest service. They are available in any desired voltage combination in capacities ranging from 50 to 20,000 watts.



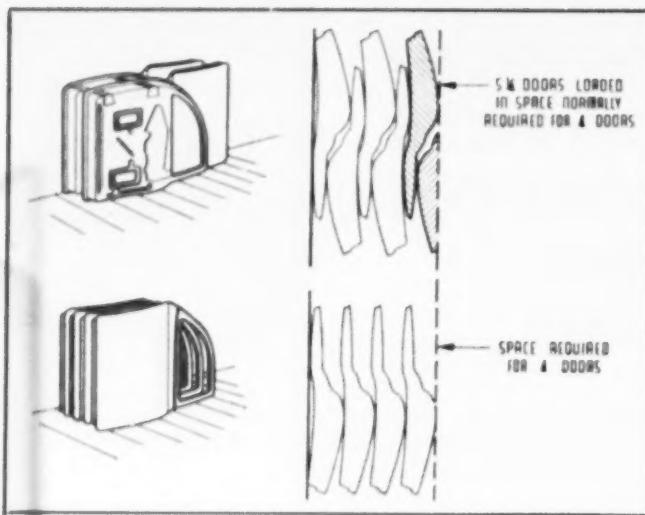
NEUTROL and ELECTRO-MATIC Rectifiers can be installed easily on equipment already in use — or built into new machines before delivery if you so specify.

*Let us send bulletins giving full information—no obligation.*

**ELECTRO-MATIC PRODUCTS CO.**  
2237 North Knox Ave., Chicago 39, Ill.

**ELECTRO-MATIC**  
Industrial  
Rectifiers

Fig. 6—Door handling.



is divided definitely into two parts: First, the design of sheet steel components making up the body shell,

this or that structural member be installed at the Fabricating or Assembly plant? Which is the most efficient,



## FOR More Speed IN MAKING SET-UPS

Making set-ups for tapping and reaming jobs can be speeded up considerably if, instead of using ordinary tool holders, you use Ziegler Floating Tool Holders.

It takes less time to make a set-up with a Ziegler Holder for the simple reason that the set-up does not have to be made as accurately. It is sufficient if the work is aligned within  $1/32"$  of center on the radius ( $1/16"$  of center on the diameter). The Ziegler Holder automatically compensates for the difference.

By reducing set-up time, the Ziegler Holder naturally reduces labor costs. At the same time it holds the work to the finest of tolerances.

*Ziegler*  
ROLLER  
SHEAR

**FLOATING HOLDER**  
for Taps and Reamers...

**W. M. ZIEGLER TOOL CO.**

13566 AUBURN  
DETROIT 23, MICH.

Types to fit any  
machine used for  
tapping or reaming

WRITE FOR  
CATALOG

# BAY STATE

QUALITY  
ON THE  
SQUARE

The squares of Bay State Taps are of exceptional accuracy and uniformity. Special machines of unusual design control this detail with precision—another reason for selecting Bay State Taps.



**BAY STATE  
TAP & DIE CO.  
Mansfield, Mass.**

**On nearby shelves of Industrial Supply Distributors.**

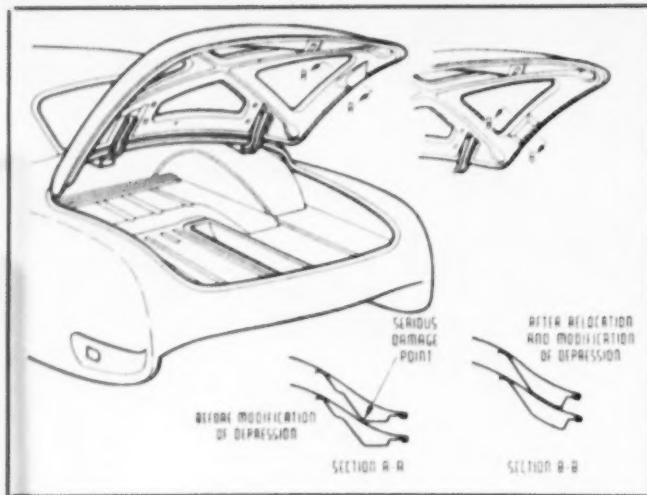


Fig. 7 — Removal of modification of hinge embossments on deck lids.

neers and Production Engineers, plus that of the management of the fabricating and assembly plants and the Materials Handling Department. The latter acts in a liaison capacity between the various groups, and is responsible for

the design and construction of materials handling equipment.

Many factors are involved in the handling of materials that are not im-

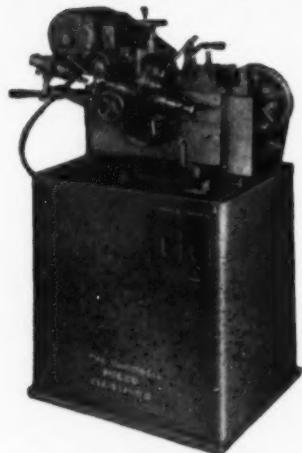
and how do costs compare?

Determination of the correct course to pursue is the joint responsibility of the Body Engineers, Die Design Engi-

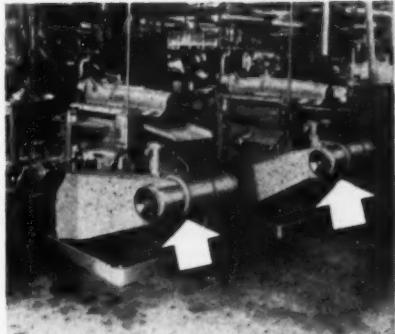
## Sharpens Saws in gangs ...grinds straight flutes from solid... automatically

1. Sharpens saws in gangs
2. Sharpens taps
3. Spiral points
4. Sharpens Reamers
5. Flutes from solid
6. Sharpens Milling Cutters
7. Sharpens Woodruff Key Cutters

*Grinds wet or dry... write  
for Bulletin 50F Automatic  
Universal Flute Grinder.*



**THE WARDWELL MANUFACTURING CO.**  
3166 Fulton Rd., Cleveland 9, Ohio



Above—TWO LIMA DRIVES applied to 28" shapers in International Harvester Company plant, Fort Wayne, Indiana

Lower production costs = Increased profits! LIMA GEARSHIFT DRIVES are solving the problem of lower operating costs for many of the country's largest manufacturing companies. Photo at left shows two shapers motorized with "selective-speed" LIMA GEARSHIFT DRIVES. This application is one of many in the Fort Wayne, Indiana plant of International Harvester Company, where LIMA DRIVES are helping produce some of the finest in Motor Trucks at lower costs. Let us make a survey and recommend the drives that will produce economically for your plant.

LIMA'S New Illustrated Drive Bulletin DB-1  
just off the press—write for your copy today.

# LIMA



Representation in principal cities

**THE LIMA ELECTRIC MOTOR COMPANY**  
116 FINDLAY ROAD • LIMA, OHIO



mediately apparent when one scans a body draft, as shown in Fig. 7. As a consequence, the Production Engineering Section is required to produce nesting diagrams of all major assemblies, as body parts drawings are received from the Engineering Division. This is done prior to the physical availability of productive parts, and is of material assistance in bringing out facts not apparent from the body part

drawing of a given part or assembly.

To settle questions that require the assistance and acquiescence of more than one of the interested parties, the problem is brought to the attention of the "Committee for Allocation of Body Construction," the chairman of which is a member of the General Manager's staff. Members of this committee include representatives of Die Design and Production Engineering, the General Factory Managers in charge of both fabricating and assembly plants, the Traffic Section, the Materials Handling Department, and the Cost Analytical Section. Recommendations of this committee are brought through the Production Engineering Section to Body Engineering for final approval in all cases where structural changes in the design of the body are involved.

The functioning of the Committee for Allocation of Body Construction best may be illustrated by examining the specific interests of its personnel. Die Design is interested in knowing whether a

**WORLD'S STANDARD  
of  
Angle Measurement**

H.O. BLOCKS and FIXTURES

STANDARD STEEL BLOCKS

CARBON CARBIDE

ANGLE BLOCKS

Degrees, minutes and seconds in any combination are at your fingertips with a positiveness and speed that has never before been equaled.

The accuracy of the laboratory has actually been brought into the shop. Information on this newest Webber contribution to precision is yours on request.

**Webber**  
GAGE COMPANY  
12899 TRISKETT RD.,  
CLEVELAND 11, OHIO

LARGEST EXCLUSIVE MANUFACTURER OF PRECISION GAGE BLOCKS

# Get Cost-Cutting Results

from **BESLY**  
ENGINEERED TO

## TAPS YOUR JOB!

\* RESULTS

**52 PIECES PER HOUR**

At one pass, instead of 3, Besly Acme form Taps thread 52 large, cold-rolled steel pieces per hour for a leading manufacturer. By correct design, the two roughers were eliminated. Tap used is  $1\frac{1}{2}''$ , 4 Acme thread, which saves production time, reduces tool costs, yet meets every requirement for close tolerances.

\* RESULTS

**THREADS 89 HOLES IN SINGLE OPERATION**

The manufacturer of a world famous tractor selected Besly high-speed taps for use on automatic machines that thread 89 holes in one multiple operation. Where set-up time is critical, rely on Besly.

\* RESULTS

**FAST DELIVERY**

is a specialty with Besly. You can get: —Over-night shipment on stock taps; fastest service on "specials" that can be made from hardened blanks; 3-week shipment on "specials" made from bar stock.



**UNSURPASSED ACCURACY**  
at all vital points



Mirror Finish  
FLUTES



"Right"  
ROCKWELL



Tru-Square  
DRIVER



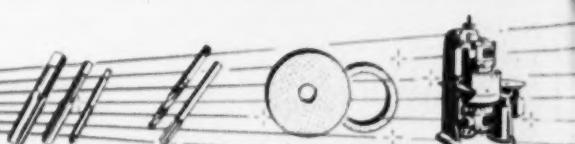
Microcentric  
CHAMFER



Solid Ground  
THREAD FORM

No matter what the material, Engineered Results, like those shown here, can be yours when you use Besly Taps. Development of the right tap for specific tapping operations has been a principal reason for the ever-widening acceptance of Besly Taps. Ask for a Besly Test on your tapping job. Prove in your shop what you'll earn in time, material, and tool cost savings, plus the peace of mind that comes with keeping even the tough tapping jobs under control.

**BESLY**



**TAPS**—the  
world's most  
accurate tap.

**TWIST DRILLS**  
AND REAMERS  
—Complete line  
for every need.

**TITAN ABRASIVE**  
WHEELS AND  
DISCS—individ-  
ually formulated  
for your job.

**GRINDERS** that  
reduce costs on  
every type of  
surface grinding.

**CHARLES H. BESLY & COMPANY**

124 N. CLINTON STREET, CHICAGO 6, ILLINOIS

Factory: Beloit, Wisconsin

given proposal can be effected economically with materials and equipment currently available. The interest of Production Engineering lies in the field of assembly tools, welding machines, jigs, and fixtures, and as might be expected, the number of such items involved. The General Factory Managers in charge of Fabrication and Assembly are interested primarily in the effect a proposal may have on manufacturing processes, quality of

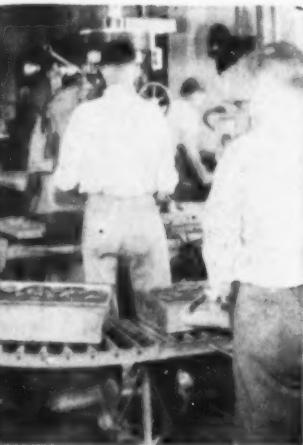
the product and operating expense. The Traffic Section always is interested in making full use of the load-carrying capacity of transport equipment and the most expedient method of shipment. The Materials Handling Department is concerned chiefly with the workability of a proposal in the field, the protection it affords the partially completed product in and between various operations, in storage, and in transit.

The Cost Analytical Section is represented on this Committee to analyze costs and to make cost comparisons. Costs are of paramount importance in such a highly competitive industry. They always are aired thoroughly in committee, but no suggestion ever is approved at Fisher Body—even if it improves efficiency—if it is felt that the quality of the product will be impaired.

The foregoing paper was presented at the third biennial Materials Handling Conference sponsored by Westinghouse Electric Corporation, Buffalo, New York, October 24 and 25, 1950.

## ENGINEERED CONVEYORS

for  
MAXIMUM  
OPERATING  
EFFICIENCY



MANUFACTURERS  
of  
PORTABLE  
CONVEYORS  
POWER HELPERS  
CONVEYOR  
SYSTEMS

Ask Metzgar to suggest a "Most-for-your-Money" conveyor system to meet your requirements.

Reduced handling costs will strengthen your position in a market that is growing more and more competitive.

WRITE FOR DESCRIPTIVE FOLDER



METZGAR CO.

466 Douglas N. W.  
GRAND RAPIDS 4, MICH.



**STANLEY No. 164 . . .  $\frac{1}{4}$ " in steel,  $\frac{3}{4}$ " in hardwood.** A production drill—bores through 1" tool steel in a half minute flat. Lightweight diecast aluminum housing, ball bearings, heavy duty spindle and gears, trigger type switches and Jacobs 3-Jaw Chucks.

## **2 NEW $\frac{1}{4}$ " Electric Drills**

See these new drills and other Stanley electric tools at your industrial distributor's, or write Stanley Electric Tools, 520 Myrtle Street, New Britain, Connecticut.

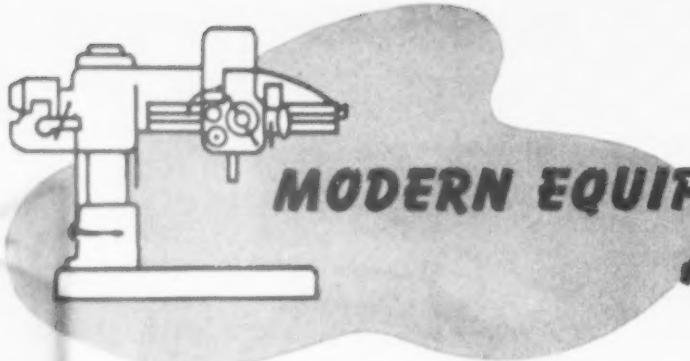
**STANLEY**

Reg. U.S. Pat. Off.

**Hardware • Tools • Electric Tools  
Steel Strapping • Steel**

**STANLEY No. 166 . . .  $\frac{1}{4}$ " in steel,  $\frac{3}{4}$ " in hardwood. Same as No. 164 above but with pistol grip handle.**





## MODERN EQUIPMENT AT WORK

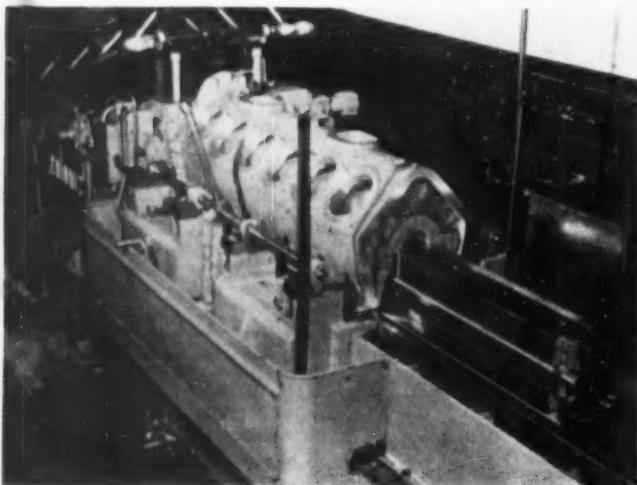
### Finish Broaching of Military Engine Parts

AMONG interesting operations in the new production line for the 12-cylinder air-cooled military engine at Continental Motors, Muskegon, Michigan, is the finish broaching of bearing cap channels and inner faces of cross bolt bosses in the aluminum alloy crankcase casting. Six flat surfaces on each of seven transverse webs in the casting (plus radii in the corners of the bearing cap channels) are

broached in a single pass with the aid of the Colonial Broach Company equipment shown in the accompanying illustration.

Tolerances are 0.002 inch for size and 0.0005 inch for squareness and parallelism, and about 0.047 inch depth of stock is removed. Locating pins on the case flange fit into recesses in the platen of the machine to ensure proper centering. A single hand-operated lever on the control side of the machine is used to actuate a series of four dogs

on each side which grip the casting flange, holding it firmly against the platen surface. The machine is a 15-ton 90-inch stroke horizontal surface broaching unit.



Setup for finish broaching bearing cap channels and inner faces of crossbolt bosses in engine crankcase casting

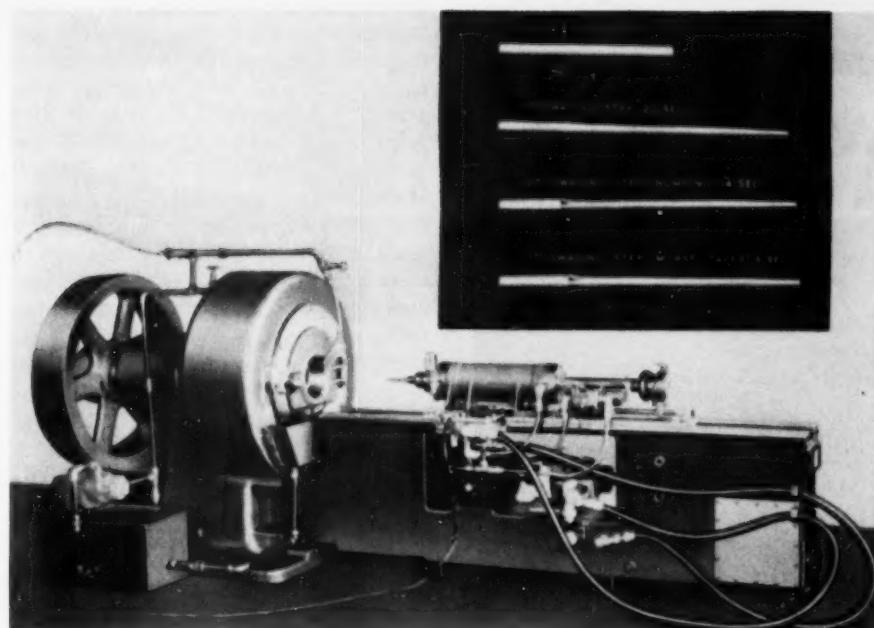


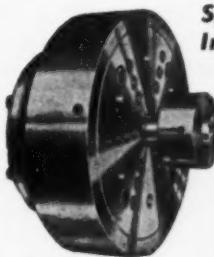
Illustration showing swaging machine equipped for producing tapered textile machine spindles in steps as illustrated in the inset

## Swager Saves Materials and Cuts Production Time in Producing Textile Machine Spindles

A SWAGING machine featuring special dies has been developed by Fenn Manufacturing Company for a textile machine manufacturer to

produce tapered spindles. These spindles were formerly produced on automatic lathes which turned blanks 10 inches in length, producing three different tapers, including the Morse taper on the shank. The spindles were then finish ground to specified dimensions.

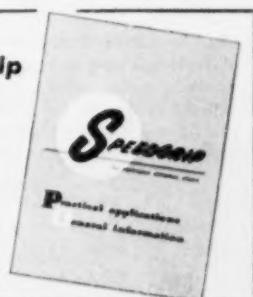
With the new swager, material re-



**Speed Up with Speedgrip... Improve Quality with Speedgrip**

It can be done—it's being done on thousands of second operation jobs. SPEEDGRIP PRECISION INTERNAL CHUCKS are guaranteed to do the job to customer's complete satisfaction. Send for a copy of the new SPEEDGRIP MANUAL today.

**SPEEDGRIP CHUCK, INC.**  
820 NORTH WARD STREET  
ELKHART, INDIANA





### THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding... not only when the grinder runs idle. It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind... not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work...longer wheel life.

**MADISON-KIPP CORP.**  
208 Wabasha St. Madison 10, Wis., U. S. A.

Write for KIPP Air Tool Catalog AT 3006

quirements are said to be cut in half. Blanks only  $4\frac{1}{2}$  inches in length are required, the material being lengthened by the swager as the tapering operations are performed. The finished length is 9 inches. Three cycles are used to produce each spindle. One set of dies swages the blank from its original diameter of  $\frac{1}{2}$  to  $\frac{3}{8}$  inch. This cycle is accomplished in 20 seconds, including loading, swaging, and removal. A "bumping" operation follows using a second set of dies, the time required being 14 seconds. The final operation is the swaging of the Morse taper on the shank end, which requires only 6 seconds.

The material used is 52100 type steel having an initial hardness of 90 Rockwell B, and the swager is said to maintain concentricity to within 0.004 inch. The blanks are fed into the swager hydraulically, and the dies are oil cooled. A finish grinding operation follows swaging. The machine is readily adaptable to a wide range of other uses in the metal-working industry.

### Automotive Plant Uses Special Machine Tool to Produce Parts

THE accompanying illustration shows a two-way horizontal six-spindle drilling machine with four-position trunnion furnished by LeMaire Tool & Manufacturing Company to a large automotive plant for drilling, counterboring, and reaming a steering gear idler and third arm bracket. The machine consists of a fabricated steel center base which supports the fixture trunnion and houses a coolant tank. Two cast iron standard end bases are provided, each of which

**INCREASES  
PRODUCTION...**

**LOWERS COSTS...**

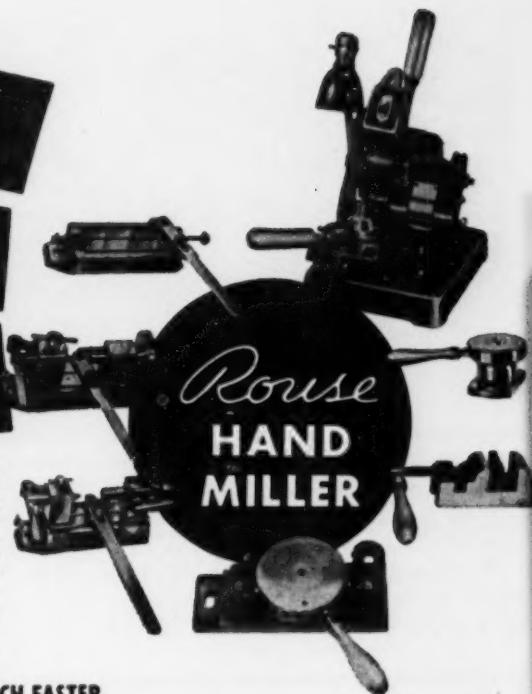
**PAYS FOR ITSELF  
QUICKLY...**

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cost. Only \$98.00\*.

Fixtures (illustrated) extra.

Motor equipment:— $\frac{1}{4}$ H.P. 110 Volt AC 60 cycle, single phase, swivel motor mount and light—\$25.00\*

\*All prices FOB Chicago.

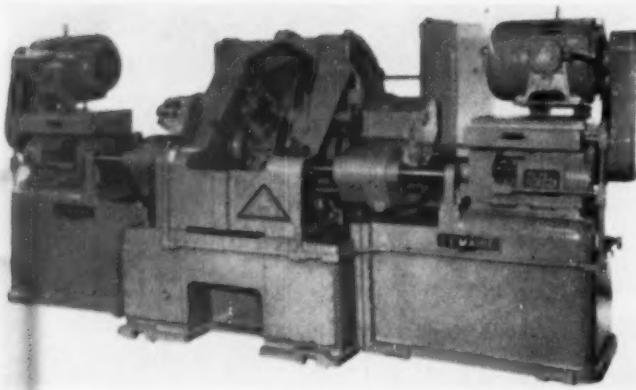


- ★ **MILLS SMALL PARTS MUCH FASTER.**
- ★ **DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.
- ★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.
- ★ **NO MORE COSTLY SET-UP TIME.** \$98.00\* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.
- ★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ **VERY LOW MAINTENANCE.**
- ★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of your production problems.

Write today  
for further  
information.

**H. B. ROUSE & COMPANY**

2214 N. WAYNE AVE., CHICAGO 14  
50 YEARS OF SERVICE TO INDUSTRY



Special machine tool  
for drilling, counter-  
boring, and reaming  
steering gear idler  
and third arm  
bracket

supports a twin ram unit for driving and feeding a three-spindle head mounted on guide bars. The trunnion carries four fixtures and is manually indexed.

The operating sequence of the machine is as follows: first station—load part; second station—drill part

from both sides; third station—counterbore part from both sides; fourth station—ream part from both sides. The indexing mechanism of the trunnion is interlocked with the hydraulic units in such a manner that the units will not operate if the trunnion is not properly located with plugging bar in place or if the trunnion is indexed in the wrong direction or more than one station. Fixtures are provided with ample chip

## Machines Handle Wider Range of Work

*when equipped with*

### LOVEJOY VARIABLE SPEED PULLEYS

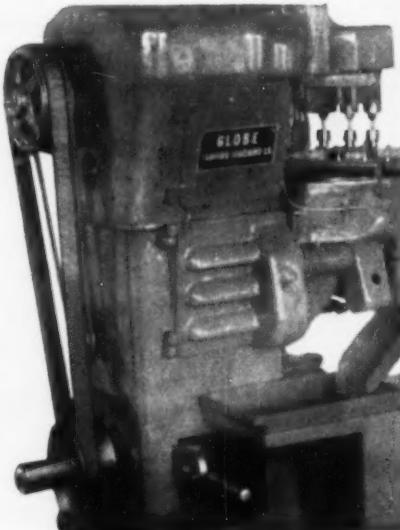
Convert fixed-speed machines to adjustable models easily, at low cost; widen range of work. Raise, lower speed at fingertouch accurately, indefinitely, without shutdowns. Sizes fractional to 8 h.p. Ratios to 3:1. Write for catalog.

**LOVEJOY**  
**FLEXIBLE COUPLING CO.**

3007 W. Lake St. Chicago 44, Ill.

Also mfrs. of Lovejoy Flexible Couplings  
and Lovejoy Universal Joints

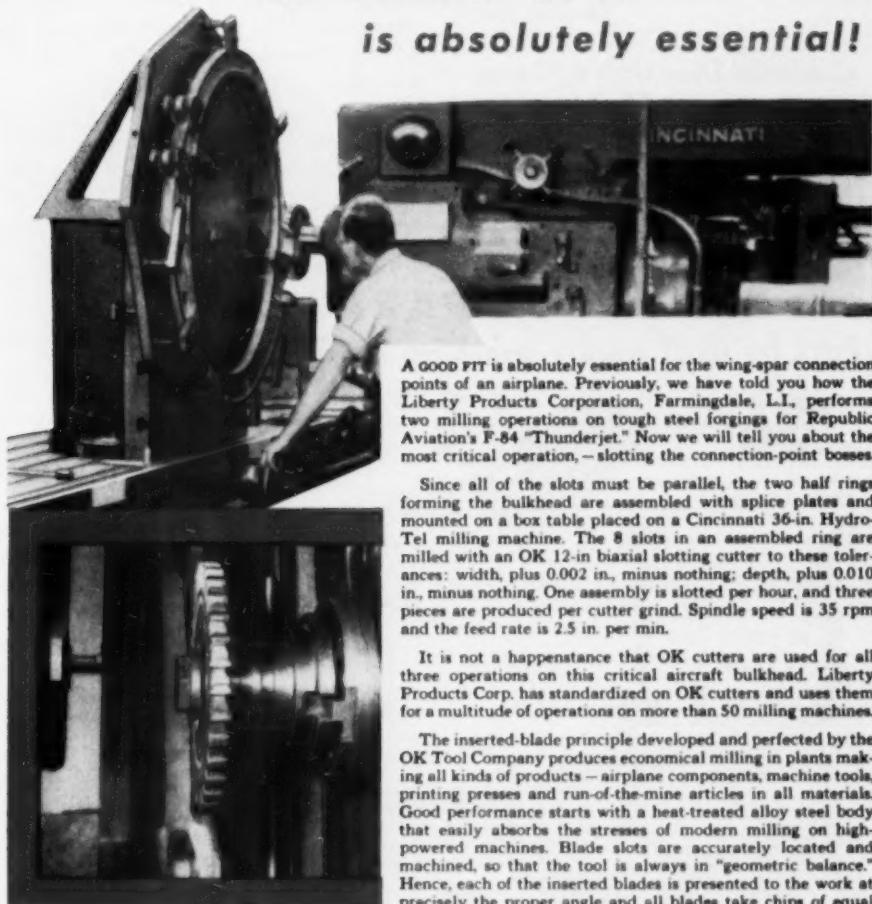
Canadian Distributor: Irving Smith, Ltd.,  
455 Craig St., W., Montreal, Canada



OK Carbide Cutters mill vital "Thunderjet" forgings - III

## A GOOD FIT

*is absolutely essential!*



A GOOD FIT is absolutely essential for the wing-spar connection points of an airplane. Previously, we have told you how the Liberty Products Corporation, Farmingdale, L.I., performs two milling operations on tough steel forgings for Republic Aviation's F-84 "Thunderjet." Now we will tell you about the most critical operation, — slotting the connection-point bosses.

Since all of the slots must be parallel, the two half rings forming the bulkhead are assembled with splice plates and mounted on a box table placed on a Cincinnati 36-in. Hydro-Tel milling machine. The 8 slots in an assembled ring are milled with an OK 12-in biaxial slotting cutter to these tolerances: width, plus 0.002 in., minus nothing; depth, plus 0.010 in., minus nothing. One assembly is slotted per hour, and three pieces are produced per cutter grind. Spindle speed is 35 rpm and the feed rate is 2.5 in. per min.

It is not a happenstance that OK cutters are used for all three operations on this critical aircraft bulkhead. Liberty Products Corp. has standardized on OK cutters and uses them for a multitude of operations on more than 50 milling machines.

The inserted-blade principle developed and perfected by the OK Tool Company produces economical milling in plants making all kinds of products — airplane components, machine tools, printing presses and run-of-the-mine articles in all materials. Good performance starts with a heat-treated alloy steel body that easily absorbs the stresses of modern milling on high-powered machines. Blade slots are accurately located and machined, so that the tool is always in "geometric balance." Hence, each of the inserted blades is presented to the work at precisely the proper angle and all blades take chips of equal thickness. And because the wedge-shaped blades require no locking devices, they cannot come loose to spoil cutter work, but they are easily removed for replacement.

OK cutters are made in a complete range of sizes and styles. Blades are offered in high-speed steel, cast-alloy or cemented carbide. Cutter bodies are available with slots to position blades for positive or negative rakes, straight or shear cuts. And blades are interchangeable for several sizes of a specific style of cutter.

Further reasons on why it pays to standardize on OK cutters are found in Catalog 13. Write for your copy.

**THE OK TOOL COMPANY, WILTON, New Hampshire**  
Division Williams and Hussey Machine Company, Inc.

**OK**  
**modern milling cutters**  
for  
**modern milling machines**

clearance, and chips drop into a compartment below the trunnion from where they can be easily removed from the rear of the machine.

### Carbide Dies Solve Manufacturing Problem

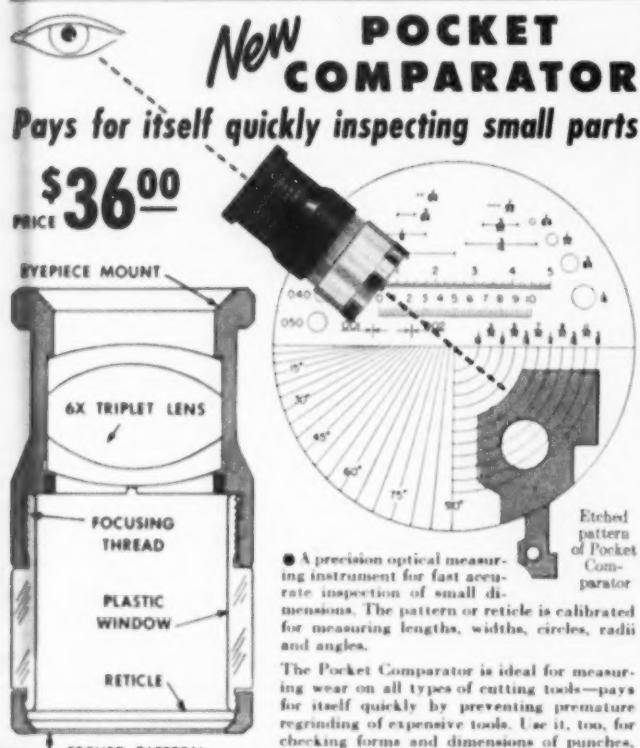
THE use of carbide dies for both blanking and forming has solved a manufacturing problem during its

peak production season for the John E. Mitchell Company of Dallas, Texas. The dies have virtually eliminated all costly former press down-time for die changes during peak production, aside from increasing overall die life some 65 times.

As shown in the accompanying illustration, the dies are used for producing channel-shaped "saw-bands" employed in cotton cleaning machines.

Stock is 0.03-inch thick cold rolled C-1040 strip steel, purchased in rolls, and is fed into one end of the automatic saw-band machine in a horizontal position from the reel. The oval hole in the channel saw is punched first. The blanking die then punches the teeth, and the forming die gives the section of steel band its final channel shape. The round hole is then punched and the saw band is cut off to length.

According to Mitchell, blanking dies previously used had to be sharpened at least once a day during the company's "busy season"—i.e., March



• A precision optical measuring instrument for fast accurate inspection of small dimensions. The pattern or reticle is calibrated for measuring lengths, widths, circles, radii and angles.

The Pocket Comparator is ideal for measuring wear on all types of cutting tools—pays for itself quickly by preventing premature regrinding of expensive tools. Use it, too, for checking forms and dimensions of punches, dies, gauges, templates as well as radii, angles, chamfers, threads and small holes on production parts. Order today.

a product of **BELL & HOWELL CO.** distributed by

See Your National Tool Co. Representative or Local Jobber

**NATIONAL TOOL CO.**

11230 Madison Avenue Cleveland 2, Ohio

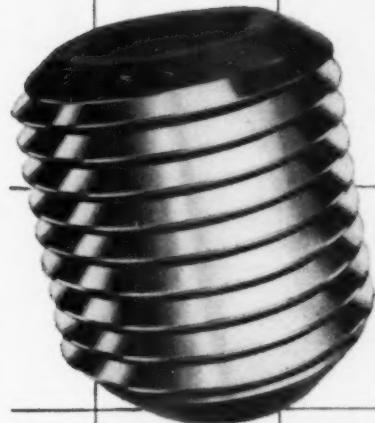


Write for  
**FREE**  
descriptive folder



# Parker-Kalon GROUND THREAD Socket Set Screws

## Give every department A LIFT



### DESIGN

Ground Thread smoothness and accuracy plus faultless thread contour and lead make P.K. Socket Set Screws first choice for a high quality product.



### ASSEMBLY

Free from nicks, burrs and tool marks, P.K. Ground Thread Socket Set Screws are consistently uniform and are made to close tolerances. Therefore they start easy, drive easy — keep assembly humming.



### INSPECTION

With a dependable Class 3 Fit, every P.K. Socket Set Screw is made of high-grade alloy steel, heat-treated to withstand severe torque and compression loads.

### SEND FOR FREE SAMPLES

See and feel for yourself the difference thread grinding makes. Try them once, and see why so many Socket Set Screw users are switching to P.K. Parker-Kalon Corporation, 200 Varick St., New York 14, New York.

\*TRADE MARK REG. U.S. PAT. OFF.



Ground Threads, heretofore available only in precision equipment, provide an extra sales feature any shrewd buyer appreciates.



**PARKER-KALON\***  
*cold-forged*  
**SOCKET SCREWS**



## SAVE SET-UP TIME...



### with "DE-STA-CO" ARBOR SPACERS and SHIMS

IT COSTS YOU MONEY when machinists waste time hunting for arbor spacers. **SAVE TIME** with two sets of "De-Sta-Co" Arbor Spacers for every milling machine in your shop.



**ARBOR SPACERS  
Keywayed**



**SHIMS  
Not Keywayed**

Handy sets available for 20 arbor diameters ( $\frac{3}{8}$ " to 4"), 19 graduated thicknesses (.001" to .125") with standard keyway. Shims same sizes, without keyway. Sets sealed in clear polyethylene envelopes, with size plainly marked. Specials, over .125" thick, available in popular arbor sizes and thicknesses, machined from bar stock, hardened and ground, with standard keyways, identified as to thickness.

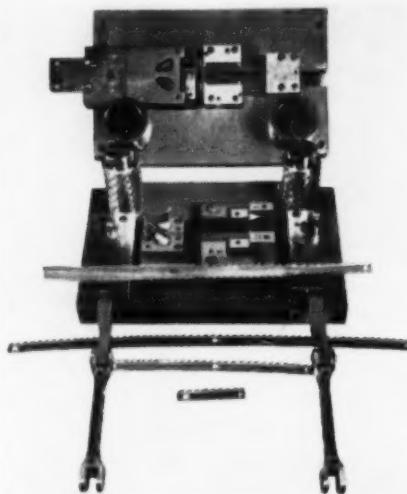
Machinists prefer durable "De-Sta-Co" steel Arbor Spacers and Shims for milling, slitting and gang-saw setups and for shimming gears and bearings. YOUR SHOP SAVES, too, when each machine has two sets handy for speedy setups. Ask your mill supply house for them by name, "De-Sta-Co", or write for Spacer and Shim Stock Price List.

**DETROIT STAMPING COMPANY**

349 MIDLAND AVE. • DETROIT 3, MICH.

through August. The Carboloy blanking die performed 20,000,000 blanking operations—a normal full year's operation—before it had to be sharpened. Thus, more than 30 hours of maintenance time per machine are being eliminated each year—most of it in the "rush" season—since down-time was at least 15 minutes per die change.

Although the initial sets of carbide



Channel-shaped "saw-bands," used on cotton cleaning machines, as produced with carbide blanking dies

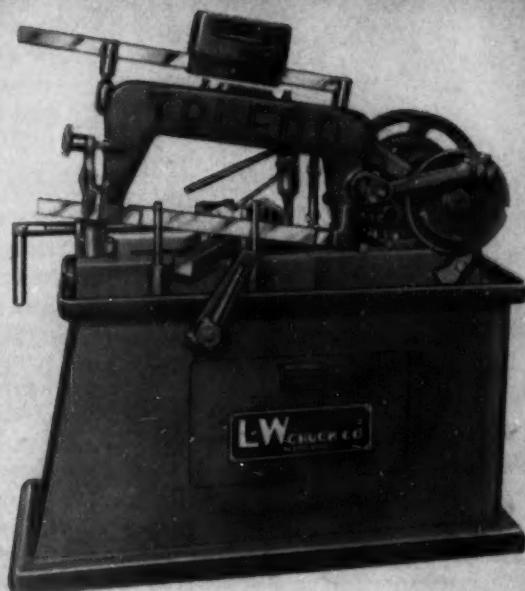
blanking and drawing dies have not as yet worn out, Mitchell estimates that the life of the blanking portion of the die will be at least 100,000,000 blanks as compared with the 1,500,000 blanks for the dies previously used—an increase in service life of more than 65 times. The change-over to carbide die sets was made without any radical departure from the original die design. The carbide dies, however, are made in sections for easier die construction whereas the original dies were made in one piece.

**LW**

**IT HAS BEEN DONE!**  
**WE ARE PRODUCING HIGH SPEED**

# POWER HACK SAWS

FOR ONLY  
**\$268<sup>91</sup>**



Stops automatically on completion of cut. Automatic relief of saw blade on non-cutting stroke. 6" x 6" capacity using 10" x 14" blades. 12" x 3" clutch pulley.

Pulley speed 120

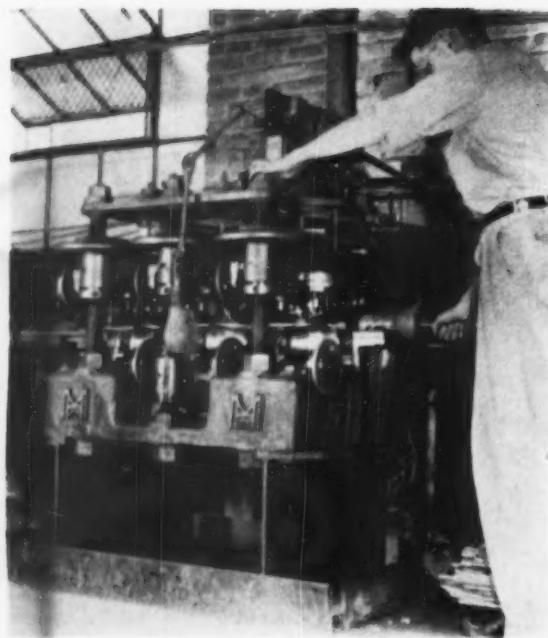
r.p.m. Coolant pump base. Swivel vise for angle cuts. All steel welded base and table. V-belt drive. Rigid frame. Gravity feed. Length gauge. Expanding clutch. 3-speed (90 to 130 r.p.m.) V-belt motor drive arrangement, \$27.84, less motors. 1/2 H.P. 1725 r.p.m. motor recommended. Completely Motorized with Switch; Single Phase \$356.95; Three Phase \$363.40.

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



## **L-W CHUCK COMPANY**

28 SO. ST. CLAIR ST.  
TOLEDO 4, OHIO



Rotary straightener installed in tube fabricating plant for straightening tubing after drawing to specified size

### Rotary Straightener Removes "Bow" from Drawn Tubing

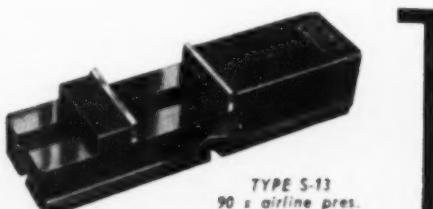
**S**TRAIGHTENING stainless steel, nickel and nickel-alloy seamless tubing to a tolerance of 0.02 inch per foot is the job performed by a Mackintosh-Hemphill rotary straightener installed in the Malvern, Pennsylvania

plant of J. Bishop & Company Platinum Works. Tubing ranging in size from  $1\frac{1}{2}$  inches down to  $\frac{1}{4}$  inch is brought to the machine after drawing, bright or open air annealing and pickling. The last draw to specified size causes each length of non-ferrous tube to take a "set" or a "bow." Deformation of the tubing back to absolute straightness is essential in order to meet rigid specifications of tubing fabricators.

Operated more than 11 hours out of each 16-hour day, the machine has eliminated former down time for retooling and requires only minimum maintenance. Running at one-half rated speed, the straightener, it is claimed by the manufacturer, assures roundness and an unmarked surface of tubing passed between its six guideless crossed rolls.

## AIRLOX PNEUMATIC VISES

Five senior models. Many special-purpose construction. 50 to 200 times airline pressure. Write for data sheets. Wedge & lever action utilizes total cylinder drive. Pat'd. Exceptional rigidity particularly suited to work-holding on CARBIDE MILLING, and almost all milling operations.



TYPE S-13  
90 x airline pres.  
 $5\frac{1}{4} \times 8\frac{3}{4} \times 29$   
Max. jaw opening 12"

Whitehall, New York

## L production devices, inc.

AMES

NO, NO BOYS! BE ACCURATE!



CHECK IT ON  
THE AMES

A cost conscious restaurateur actually employs an Ames Thickness Measure to hold pie crust thickness to a uniform standard, thereby cutting down raw material waste, lowering fuel costs and assuring top quality pastry day in and day out. This unusual solution to a measuring problem is illustrative of the creative thinking of Ames engineering and design department. They'll tackle any measuring problem you may have and come up with a sound answer that will improve your quality control. Ames has built gauges to measure the thickness of potato chips, soap flakes, enamel on teeth, as well as gauges that check the sway of buildings, the stretch of bolts plus many others that solve successfully unusual and difficult applications. If you are puzzled and want an economical answer to a measuring problem, send it to B. C. Ames today.



Ames No. 1 Dial Comparator — measures objects up to 2" in cross section. Adjustable table with positive locking screw. Height 9½", weight 4 lbs., Dial Indicator graduated .001", with .250" range.

Representatives in  
principal cities

B. C. AMES CO. 29 Ames Street, Waltham 54, Mass.  
Mfrs. of Micrometer Dial Gauges • Micrometer Dial Indicators

**NOTE THIS AMAZING  
INCREASE IN  
PRODUCTION**

**When Using the  
"M-B" JUNIOR  
PNEUMATIC  
GRINDER**



"In one of the applications, where M-B Grinders are employed, (using a  $\frac{3}{8}$ " dia. Tungsten Carbide Burr with  $\frac{1}{4}$ " shank) the following improvement in production took place. Previous to the application of our Junior Pneumatic Grinder, it took 7 girls 8 hours to turn out 200 pieces. Now 1 girl is turning out 1600 pieces in an 8-hour period."

The above record was made in a plant of one of our country's largest manufacturers. Although there had been a general overhauling of their procedure, the greatest part of this improvement was credited to the use of M-B Junior Grinders. Your production can likewise benefit by the use of these modern M-B devices.

Also Automatic Air Line Filters,  
Regulators and Lubricators

•  
**Write for Literature**

**M-B PRODUCTS**  
46 Victor Ave.  
DETROIT 3, MICHIGAN

### Fast Setup for Drilling Cross-Holes

THE setup shown in the accompanying illustration was recently devised for a certain manufacturer by the Govro-Nelson Company for the particular purpose of drilling cross-holes



Setup for drilling cross-holes in fishing tackle swivels

in fishing tackle swivels of seven different sizes. With the two drilling units operating simultaneously, the cross-holes are drilled at a rate of up to 1,000 per hour, depending upon the size of the swivel. So designed as to clamp and unclamp the part automatically, the setup requires but little skill on the part of the operator and is readily adaptable to a variety of parts.



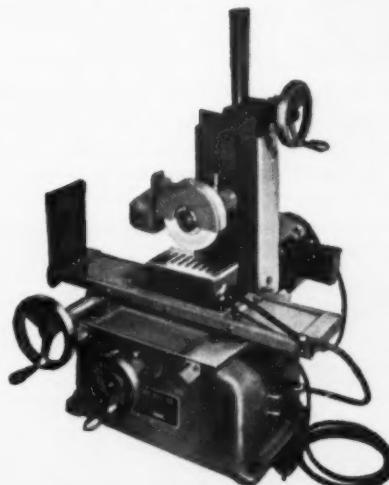
# SANFORD

## SURFACE GRINDER

I F I T F I T S

IN THE PALM OF YOUR  
HAND

GRIND IT ON THE  
**SANFORD**



Model SG



The capacity of this sensitive highly accurate, Bench Model is 4" transverse—8" longitudinal—6" vertical under 4" Wheel. Meehanite Casting s and a very sturdy construction assure long life, vibrationless operation and finishes to micro-inches.

Write for complete details.

**SANFORD MANUFACTURING CO.**  
**1021 COMMERCE AVENUE**  
**UNION, NEW JERSEY**

*"Custom-built" Quality...  
production line cost*

**APEX**

**Sockets,  
Universal Sockets,  
Extensions, Adapters**



**APEX**

**Sockets, extensions, adapters**

**THE APEX MACHINE & TOOL COMPANY  
1027 S. Patterson Blvd. • Dayton 2, Ohio**

*Safety Friction Tapping Chucks • Vertical Float Tapping Chucks • Self-Releasing and Adjustable Stud Setters  
Power Bits for Phillips, Frearson, Slotted Head, Clutch Head, Hex Head and Socket Screws • Hand Drivers  
for Phillips, Frearson and Clutch Head Screws • Aircraft and Industrial Universal Joints • Sockets and Universal  
Joint Socket Wrenches.*

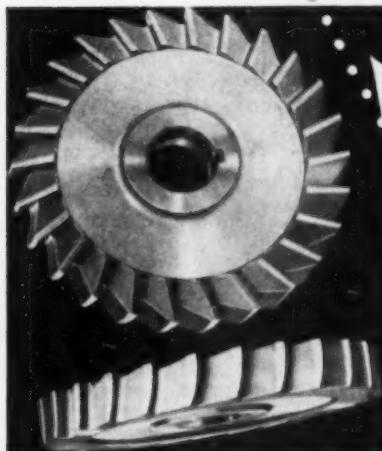
**150  
to  
425**

**YES** . . . in a recent comparative performance test, 150 Aber "Curved Tooth" milling cutters out-performed 425 conventional type milling cutters — a  $2\frac{1}{2}$  to 1 increase at NO EXTRA COST!

Designed and developed specifically for production men who look to NEW tool designs to reduce top-heavy metal cutting costs, Aber "Curved Tooth" milling cutters operate at speeds 10% to 25% faster than standard straight tooth milling cutters in addition to providing smoother finishes and



close to tolerance operations. Utilizing the most outstanding tooth design developed in the past decade, Aber Engineering Company produces a complete line of quality milling cutters featuring the "Curved Tooth" principle.



A TYPICAL ABER "CURVED TOOTH" PERFORMANCE

OPERATION: Milling lugs on plate. Slotting and side milling parallel sides.

MACHINE: Cincinnati 3-Spindle Mill.

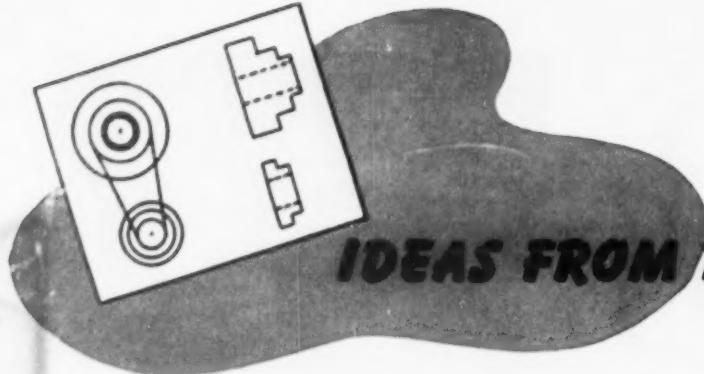
TOOL SETUP: 1/8 H. and 1/4 H. Shear Side Milling Cutter  
1/8 H. Half Side Milling Cutter  
1/4 H. Half Side Milling Cutter

FEED: 10-1/2"

PERFORMANCE: 16-1/2 hours between grinds. Best previous practice with conventional straight tooth HSS Milling cutters was 6-1/2 hours between grinds.

**ABER**  
**ENGINEERING WORKS INC.**  
**WATERFORD, WISCONSIN**





## Special Tailstock Center for Long, Heavy Pipe and Tubing

By IRWIN MANSFIELD

**L**ONG, heavy pipe or tubing which must be turned in a lathe may be effectively supported by using an inverted tailstock center such as the one illustrated herewith. The special center is made from a round piece of hardened tool steel which is turned internally at one end to an angle of 30 degrees. The opposite end is turned down to a taper, and this end is fitted into the tailstock of the lathe, as shown.

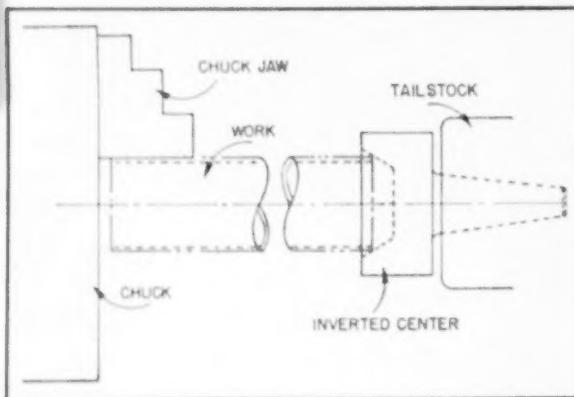
In operation, a long piece of heavy

pipe or tubing is first chucked lightly on one end, and then the tailstock center is moved in until contact is made between the o.d. of the workpiece and the conical surface in the special center. Next, the chuck jaws are tightened securely, and the work is then held rigidly, supported on both ends. Machining operations may then proceed.

## Shop-Made Spline Gage

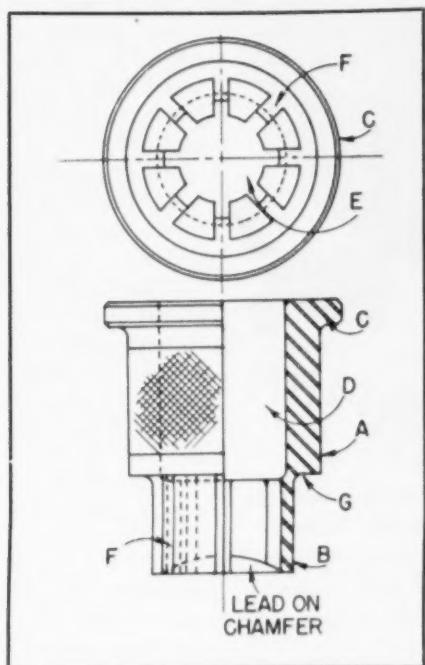
By W. M. HALLIDAY  
England

**T**HIS article discusses the design of a female type spline gage for accurately gaging splined shafts, rods, and similar parts which can be economically produced in the toolroom. Referring to the accompanying sketch, the gage consists of a cylindrical steel body, A, the overall length of



Sketch showing special tailstock center used when turning long, heavy pipe or tubing

which is equivalent to approximately three times the diameter of the part to be gaged, measuring across the root of the splined portions. At one end, the outside diameter of the gage is substantially reduced for approximately one-third the overall length, as shown at **B**. Formed integrally at the other



Sketch of economically-made spline gage with readily accessible spline grooves

end of the gage body is an enlarged cylindrical collar or flange, **C**. The portion of the body immediately behind this flange is externally knurled to provide a firm gripping surface.

The gage body is bored out to two different diameters, as shown at **D** and **E**. The diameter of the bore **D** should be made from 0.032 to 0.06 inch larger than the maximum outside diameter of the workpiece measured over

# SAVINGS UP TO 50%

THROUGH INCREASED  
LATHE AND  
MAN-HOUR OUTPUT



## IDEAL LIVE CENTERS

For Light or Heavy Turning

Users report savings up to 50% with quality and accuracy of work markedly improved. Spoilage and overheating both eliminated. IDEAL Live Centers are permanently accurate due to special bearing seal, short overhang and unique bearing arrangement that gives maximum rigidity. Available in all standard sizes. "Multi-Duty" for male, female and pipe-type points. "Heavy-Duty" for big jobs — accurate to .0005".

OTHER PRODUCTION SHORTCUTS  
Available from your Ideal Distributor  
Electrical Etchers • Tachometers  
Demagnetizers • Dust Collector



### CLIP AND MAIL TODAY

IDEAL INDUSTRIES, Inc.  
1031 Park Avenue  
Sycamore, Illinois



Please forward catalog information on Live  
Centers and other production short-cuts.

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

the crests of the splines on this member. In addition, the bore should be machined slightly deeper than the length of the knurled portion on the gage body so as to join with the smaller bore **E** at a point slightly below shoulder **G**.

The two bores **D** and **E** must be machined exactly concentric with each other as shown. The diameter of the bore **E** should be exactly the same

as the root diameter of the workpiece measured at the base of opposed splines. This bored out portion of the gage is internally grooved, as shown at **F**, to provide the necessary identical splining as required on the workpiece. The grooves **F** should be machined slightly shallower in depth and narrower in width than finally required so as to leave a sufficient amount of material on those portions for subsequent light grinding or lapping operations.

It will be noted from the sketch that the spline grooves can be machined completely across the reduced portion, **B**, of the gage body. To accurately machine the grooves, all that is required is to ensure that the gage body is correctly centralized with the milling cutter before starting each cut, which is made to such a depth as to cause the grooves to break into bore **D**.

In performing the spline milling operations, the body of the gage is fastened to the top of a circular dividing table on the milling machine with the

## THE FIRST NEW IDEA IN DRILL JIG BUSHINGS...



### M E Y C O Carbide Inserted Bushings SAVE money 7 ways:

Talk about "earning their keep," look at the ways Meyco Carbide Inserted Drill Jig Bushings will save production costs: (1) Last longer . . . with a life—in most cases—as long as solid carbide bushings at prices that come close to the prices of ordinary steel bushings; (2) Increased life for your drill jigs and fixtures; (3) Increased life for your drills and reamers; (4) Accuracy maintained for a LONG PERIOD of time; (5) Less non-productive machine time, less lost man hours, because bushings need not be changed as often; (6) Inspection time saved, because of greater accuracy for a longer time; and (7) Less waste due to spoilage, for the same reason. MOTORMAKER SAYS: "High-Speed steel bushings averaged ten days' life, MEYCO bushings, after three months' use, show no signs of wear."

For information and  
prices write for Meyco  
Bushing Catalog No. 16.



W. F. MEYERS CO., INC., BEDFORD, INDIANA

If you use PUNCHES and DIES it will  
pay you to specify..  
**CLEVELANDS**

Write for a copy of  
our No. 11 Hand Book.

We can furnish you with dependable Punches and Dies for all makes of Power, Hand or Foot Punching Machines and Presses, immediately from stock, in 29 sizes ranging from  $5/32"$  to  $1\frac{1}{2}"$  punching diameter. Special sizes and shapes to meet particular requirements are made to order promptly.

If you are interested in economy, investigate the savings offered by The Cleveland System of Standardization for Punches and Dies by which it is possible to punch various sizes of holes by the use of the same nut and punch stem.



flanged end, C, down. The end face of the flange should, therefore, be machined square with the bored portions D and E and, of course, absolutely flat so that the body may be correctly aligned. Two or more small straps or clamp plates are required for holding the gage body in place. To centralize the body in reference to the table, a small locating plug is used which has a shank portion designed to fit tightly

into the center hole in the table, and a head turned concentric to provide a light press fit into the bore of the flanged end of the gage body.

No male master plug is required in setting up the gage body since the grooves F may be accurately located and machined completely across the gage diameter. After hardening the gage, the sides and bottom of the respective grooves may be lightly cleaned up with a grinding wheel, or lightly lapped, to the required finished dimensions and precision tolerances without any difficulty.

After milling the spline grooves F in the manner described above, it is necessary for the toolmaker to pass a smooth oil-stone along the sides and corners of the grooves in order to remove the razor edge or slight burr thereon caused by the milling cutter or grinding wheel.

This type of gage is especially useful where female spline gages having a large number of grooves or small bore diameters must be reproduced.

**FEDERAL** *Open back  
Adjustable* **PRESSES**

25 YEARS OF QUALITY CONSTRUCTION

**NEW 35-TON PRESS**  
designed with important  
extra features — to handle  
a wider range of jobs!

- ★ **EXTRA SHUT HEIGHT**  
— available 1" to 10" over  
standard
- ★ **EXTRA THROAT DEPTH**  
— 11 1/2" — deeper than any Federal  
of comparable capacity
- ★ **EXTRA LONG STROKE**  
— any stroke from 1" to 8"

Write for new catalog showing entire line — sizes 6 to 80 tons

FEDERAL PRESS CO., 504 Division St., Elkhart, Ind.

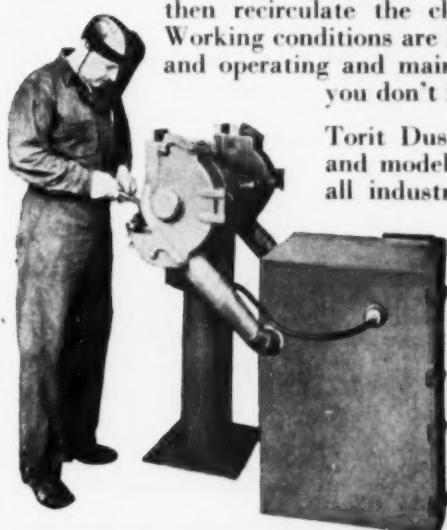
## **It's a Fooler**

*If you play bridge you've probably met some version of the Tennessee Heart hand. Good as the South hand looks, it can't even make a one heart bid. Try it and see.*

♠ J 10 8	9 7 5 3 2
6 4	—
♥ —	8 7 6 5 4
♦ 3 2	—
♣ 10 9 8	7 6 2
5 4 3	—
	N
	W E
	5
	—
	♦ A K Q
	—
	♦ A K Q J 10 9
	—
	♣ A K Q J

## **There's no fooling when TORIT DUST COLLECTORS go after dust in your plant**

You score a grand slam when you equip cutoff, grinding and polishing machines with Torit Dust Collectors. Easily installed, without upsetting production layouts, they capture dusts, filter and then recirculate the cleaned air back into the room. Working conditions are bettered, there are no heat losses, and operating and maintenance costs are very low . . . you don't miss a trick.



Torit Dust Collectors come in many sizes and models. They are adaptable to nearly all industrial operations. So, if you have a dust problem, put in your bid to:

**TORIT**

**Manufacturing Co.**

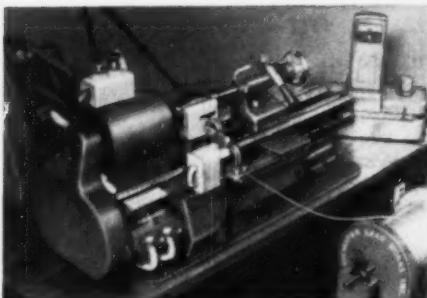
296 Walnut St. • St. Paul 2, Minn.

P. S. Also ask for the new Torit catalog

## Lathe Adapted as Winding Machine

By IRA S. ROBERTS

**R**ECONIZING the need for a faster and more accurate solder winding machine, the Rochester Lead Works, Rochester, N. Y., has developed a unique and efficient machine for solder winding purposes. A small South Bend precision bench lathe is used as the



South Bend 9-inch Model A lathe with electronically controlled equipment for solder winding added

Carter

CUTS COSTS WAY DOWN!

NEW JIFFY TIRE EASY TO APPLY!

Jiffy Tires go on in less than 5 minutes. No cement, glue, rims, bolts or special tools needed. And, Jiffy Tires are made in sizes to fit any bandsaw wheel. Molded from tread-rubber with steel backbones. Carter products universally accepted as standard equipment by leading bandsaw manufacturers.

Write -  
For free illustrated folder!

CARTER PRODUCTS COMPANY INC.

47 Mount Vernon, N. W., Grand Rapids 4, Mich.

Avey AUTOMATIC INDEX TABLE for... Low Cost Installation  
PEAK Low Cost Operation  
PRODUCTION!

4 to 16 Indexes.  
24", 30", 36" Tables Interchangeable.  
Entire Unit Self-Contained.  
Built on Unit Construction Principle.  
All Drive and Control Mechanisms underneath  
Table for Free Working Surface... Easy Accessibility!

THE Avey Drilling Machine Company  
• Cincinnati 1, Ohio •

# Looking for *Greater Time Savings*

Investigate abrasive and rubber BRIGHTBOY for a really unique action of almost limitless versatility and outstanding savings.

## In finishing METALS • WOOD GLASS • PLASTICS ?

The Soft Rubber Binder Cushions The Abrasive  
THE COMBINATION of abrasive and rubber, working simultaneously, produces  
**BURRING • FINISHING • CLEANING • POLISHING**  
in one, time-saving operation

Savings achieved by Brightboy frequently amount to 50% and more when compared to methods previously used.

Ask your dealer about Brightboy — and for the Brightboy catalog-manual which gives work-saving suggestions. Write the Brightboy Service Department on any problem where abrasive finishing methods or production are involved.

Made in  
WHEELS, STICKS, RODS, BLOCKS  
for machine and manual  
operations.



**BRIGHTBOY INDUSTRIAL DIVISION**  
Weldon Roberts Rubber Co., Newark 7, N. J.  
America's Pioneer Manufacturers of  
Rubber-Bonded Abrasives

### SOME BRIGHTBOY APPLICATIONS



### HOW BRIGHTBOY SAVES PRODUCTION TIME

1. Bridges the gap between the rough grind and the buff.
2. Works to close tolerances; can be shaped to contour.
3. Produces a wide variety of conventional and special finishes and patterns; frequently the final polish.
4. Requires no before-use preparation or dressing; no skilled labor to handle it.

### SOME BRIGHTBOY USES

Removing light digs, tool and heat marks.  
Cleaning welded and soldered joints.  
Finishing dies and molds.  
Burring stampings, castings, machined parts.

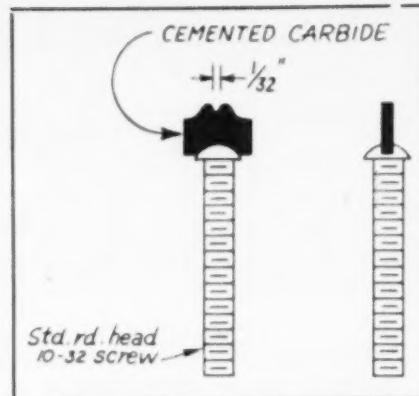


machine was made partly because of its wide range of power longitudinal feeds. The use of a standard quick-change gearbox, plus the ease with which special ratio intermediate gears can be obtained, greatly reduced the expense involved in obtaining proper feeds for the various diameters of wire solder to be spooled.

## Unique End Mill

By FRED V. WILLIAMS

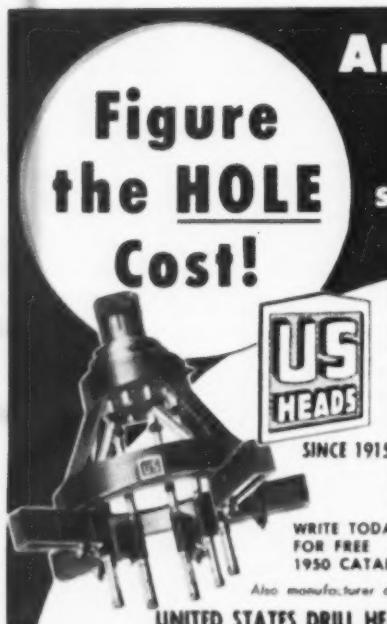
**A** UNIQUE and simple method for producing a small end mill for machining oil grooves in sleeve bearings was worked out recently in the small and medium motor divisions of the General Electric Company. As shown in the accompanying sketch, the mill consists of a standard Car-



Sketch of unique end mill for machining oil grooves in sleeve bearings

bolt 883 blank which is simply brazed into the slot in the head of a 10-32 round head screw. The blank is then ground to the desired shape, and the end mill is finished.

# Figure the HOLE Cost!



**US HEADS**  
SINCE 1915

WRITE TODAY  
FOR FREE  
1950 CATALOG

## ADJUSTABLE MULTIPLE DRILL HEADS

Fit any machine, 2 to 10 Spindles. Save 2 to 10 Operations

PRICES: 6" DRILLING AREA			
1/4 capacity, 21/32 center			
U-1 3 Spindle Head	\$234.00	U-1 6 Spindle Head	\$265.00
4 " "	243.00	7 " "	281.00
5 " "	250.00	8 " "	312.00

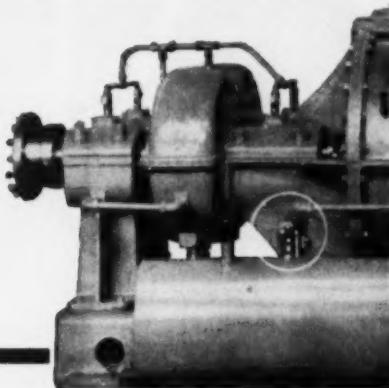
PRICES: 10" DRILLING AREA			
1/2 capacity in cast iron standard 3/4 special adoption in cast iron			
U-2 3 Spindle Head	\$302.00	U-2 7 Spindle Head	\$471.00
4 " "	344.00	8 " "	513.00
5 " "	387.00	9 " "	556.00
6 " "	429.00	10 " "	598.00

**IMMEDIATE DELIVERY**

Also manufacturer of all types of fixed center and individual lead screw tapping heads.

**UNITED STATES DRILL HEAD CO., Dept. G, 616-18 Burns St., Cincinnati 4, O.**

For  
**BEST PRODUCTION**  
You Need  
**BEST EQUIPMENT**



*that's why*

ROOTS-CONNERSVILLE BLOWER CORPORATION  
CONNERSVILLE, IND., installs

OIL-RELIEF **FULFLO** BY-PASS VALVES

This outstanding manufacturer incorporates FULFLO VALVES shown directly above the tank or oil reservoir in the efficient R-C Rotary Positive Gas Pumps.

FULFLO VALVES maintain constant, uniform pressures . . . NO MAINTENANCE . . . and they're CHATTERLESS because of the manner in which the cylindrical piston closes off the port.

Pipe sizes:  $\frac{1}{4}$ " to 2" standard pipe thread and STD 300 lb. American flange valves 1" to  $1\frac{1}{2}$ ".

THE



Write TODAY on your letterhead for  
FULFLO MECHANICAL DATA BOOK

**Specialties Co., Inc.**

BLANCHESTER, OHIO

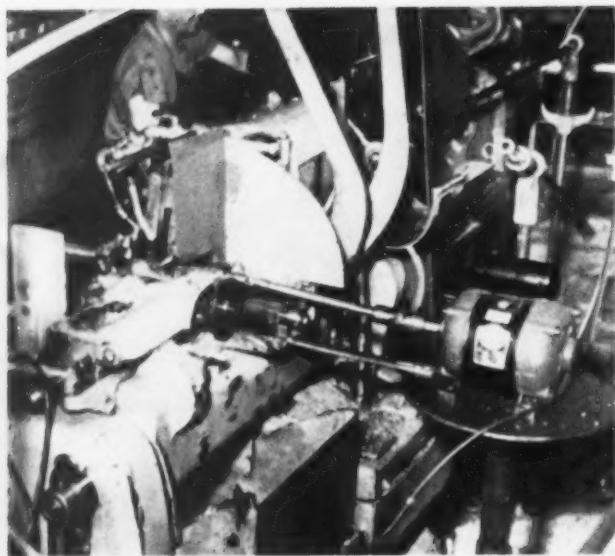


Fig. 1—Motor stand type of auxiliary drive for actuating cross drills and cross milling and turret attachments on screw machines

## Auxiliary Drives for Screw Machines

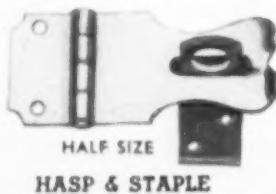
By HOWARD E. JACKSON

LAMSON PRODUCTS COMPANY of Seattle, Washington, has a number of different sizes of Brown & Sharpe screw machines which are used in medium and small lot jobbing production. Inasmuch as this firm produces over 3,000,000 small items a year, the problems which arise in applying power to these machines are

important. To meet these problems the company has developed several auxiliary drives.

As shown in Fig. 1, one type of drive consists of a motor mounted on a stand and attached to the machine by drive shafts with two universal joints for actuating cross drills and cross milling and turret attachments. While the drive is positive and flexible from one machine to another, it is limited in speed range to that of the motors used. The principal advantage of this type of drive is that positive power can be provided to any machine with only one drive stand.

Another type of auxiliary drive is the Jarvis flexible shaft unit shown in Fig. 2, which has a built-in speed range of from 850 to 11,000 r.p.m. and



HALF SIZE

HASP & STAPLE

**S & S HINGE AND METAL PRODUCTS CO.**

4725-4735 IOWA ST.



**WITH OR WITHOUT HOLES**

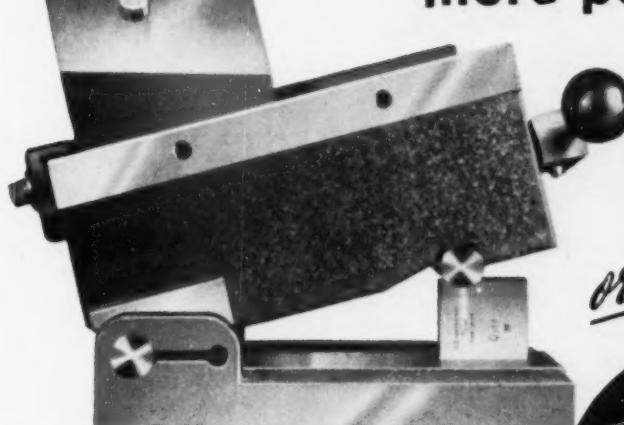
Butts and Continuous Hinges for Cabinets, Cases, etc.

DEPT. M

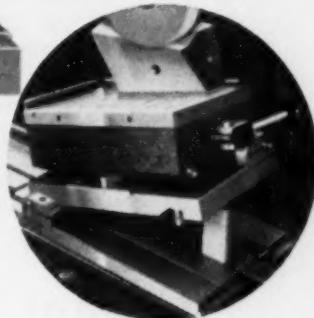
CHICAGO 51, ILLINOIS



what could be  
more positive...



*or simpler?*



## The MAGNA-SINE for angular work

The Magna-Sine, used with standard gauge blocks, is the only positive shop method of making fast angular set-ups. Plus this angular accuracy, the work piece is held securely, without distortion, by magnetic attraction on a permanent-magnet chuck.

The Magna-Sine—except magnetic parts—is made of hardened, seasoned steel and *all* gauging surfaces are ground and lapped flat and square for positive accuracy from every set-up.

Set-ups are made by inserting standard

gauge blocks between the plates of the Magna-Sine. The proper blocks are indicated for all angles in the Table of Constants furnished with every unit. No dials to go out of adjustment; no scales to misread . . . no parts to move or go out of adjustment after the set-up is completed.

*Write for descriptive bulletin which gives full details and prices on these versatile units. Thousands are in daily use.*



OMER E.

*Robbins* COMPANY

Manufacturers of the MAGNA-SINE and Other Precision Tools

5722 Twelfth Street • Detroit 8, Michigan

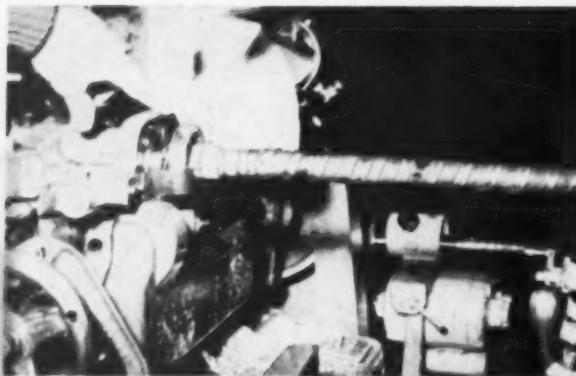


Fig. 2—Jarvis flexible shaft type auxiliary drive being used with high speed turret drilling attachment on screw machine

can be used in any desired position to drive practically any power driven attachment that can be applied to a Brown & Sharpe screw machine. This unit is shown being used with a high speed turret drilling attachment installed on No. OOG screw machine in

which case the drill was operated at a speed of 6,000 r.p.m. for a 30-day production run of a small airplane part with excellent results.

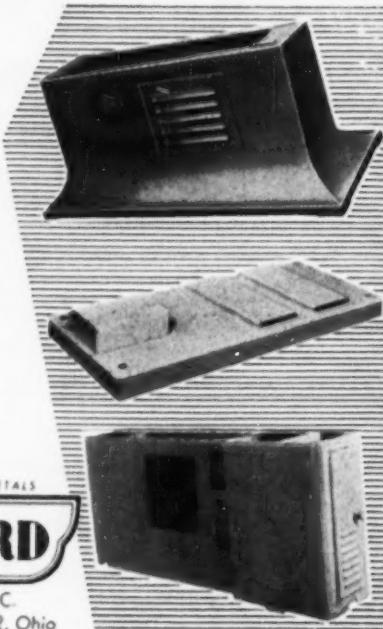
No whipping was noticed from high speed indexing, and the shaft performed very satisfactorily.

The same drive arrangement was also applied to a specially built drill mounted in a vertical slide on a No. OG screw machine, as shown in Fig. 3.

## fabricated to your specifications

When designing new machines or redesigning old ones, remember Fabricated Bases are stronger; remember too that Littleford can fabricate shapes from plate and sheet metal to fit any machine, any size. Skilled workmen and modern equipment for shearing, flame cutting, punching, bending, rolling and welding are your assurance of quality work at low cost. No matter what your base problem may be, send blueprints to Littleford for an estimate of cost. Send also for Bulletin on Littleford Fabricated Bases.

FABRICATORS OF PLATE AND SHEET METALS



**MACHINE BASES**

# WOODWORTH



## DIAPHRAGM ARBOR

For complete information  
write for December issue  
of NAWCO NEWS



## WOODWORTH

N. A. WOODWORTH CO., 1300 EAST NINE MILE ROAD • DETROIT 20, MICHIGAN  
COMPLETE LINE OF PRECISION GAGES • DIAPHRAGM CHUCKS • CONE-LOK JIGS

The drilling head consisted of a Foredom No. 40 ball bearing type handpiece.

The large, multiple wound flexible shaft was built by Lamson Products Company and attached to a Jarvis motor drive which drove the vertical drill at a speed of 4,000 r.p.m. for a production run of 80,000 aluminum parts. A drive of this type can be used with

**Want the best?**



*Specify ACE  
DRILL BUSHINGS*

- 3/4 MILLION BUSHINGS IN STOCK  
is your assurance of prompt service
- WEST COAST AERO TOOL'S REPUTATION  
is your guarantee of highest quality
- HIGHEST QUALITY TOOL AND ALLOY STEELS  
provides extreme durability and longer life
- PRECISION MADE — LIGHT-WAVE TESTED  
for .0003 maximum tolerance

**ACE DRILL BUSHING CO.**  
Division of West Coast Aero Tools Co.  
1400 FOUNTAIN AVENUE, HO 9-8253 LOS ANGELES 31

*Only ERRINGTON  
Adjustable  
TAPPING HEAD  
Offers So Many Advantages*



- Fully geared
- Needle bearings on all spindles in head
- Ball thrust bearings throughout
- Brass bushed
- Sand cast aluminum case
- All parts fully enclosed for pressure lubrication and protection
- Non-slip positive clamping on all adjusting members

Spindles: #9 - #10 Tap to 8-1/2-  
#11 - 3-1/2" Tap to 8-1/2-  
No. Spindles: 2 to 6

Here's a versatile tool which permits you to take advantage of a wide range of adjustment — without breaking. Supplied with 3 spindles for equal adjustment in line and 3, 4, 5 or 6 spindles for equal adjustment on bolt circles.

*Write for  
Complete Information*

**ERRINGTON Mechanical Laboratory, Inc.**  
Established 1891  
STATEN ISLAND 4 - NEW YORK

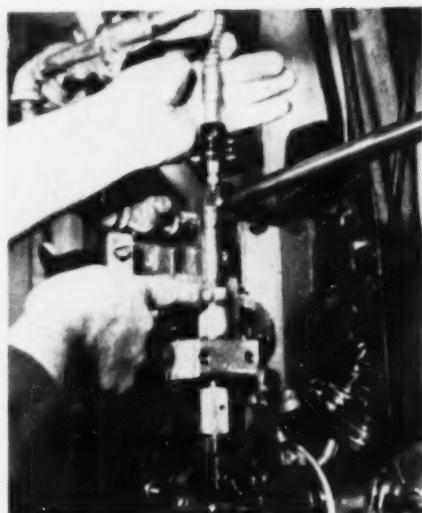


Fig. 3—Foredom ball bearing handpiece mounted in a vertical slide, with quickly detachable handpiece connection coupled to Lamson Products specially developed flexible drive shaft

a power source of up to  $\frac{1}{4}$  h.p. if necessary and has the same flexibility as the motor stand type drive shown in Fig. 1 in that it can be applied to any size machine, with the advantage that practically any desired speed can be obtained. To provide for right or left-hand operation, the threaded shaft can be locked, splined or keyed to the handpiece.

**Vi-Speed**



- FAST
- RUGGED
- HOLDING
- PRESSING
- PUNCHING
- SIMPLE DESIGN
- 5 MODELS
- Guaranteed
- WRITE FOR CATALOG

**VAN PRODUCTS CO.**  
134 G. D. BALDWIN BLDG.  
ERIE, PENNA.

# YOURS for the ASKING

BORING with KENNAMETAL

HEAVY DUTY TURNING with KENNAMETAL

INTERRUPTED CUTTING with KENNAMETAL

GROOVING with KENNAMETAL

PLANING-SHAPING with KENNAMETAL

THREADING with KENNAMETAL

MILLING with KENNAMETAL

Thousands of  
on-the-job Performance  
Reports describing and  
illustrating actual machine  
shop problems and how  
they were solved with  
**KENNAMETAL**

- Suppose you could ask thousands of practical machine shop men—"What was the best production idea you had this year?" Wouldn't their answers save you headaches, time, and money?

Kennametal Inc. has the answers—more practical information on jobs of diversified types on all kinds of materials than has ever before been accumulated and offered.

Jobs are classified so that we can send you data sheets on that type of work that interests you. Just ask for Performance Reports and mention the general type of job and material.

*Do we have reports on the "tough" jobs you have solved with Kennametal tooling? Our representative who calls on you will appreciate the details.*



**KENNAMETAL Inc.**, Latrobe, Pa.

MANUFACTURERS OF SUPERIOR CEMENTED CARBIDES  
AND CUTTING TOOLS THAT INCREASE PRODUCTIVITY



STYLE BL



STYLE C



CLAMPED ON  
STYLE FLH



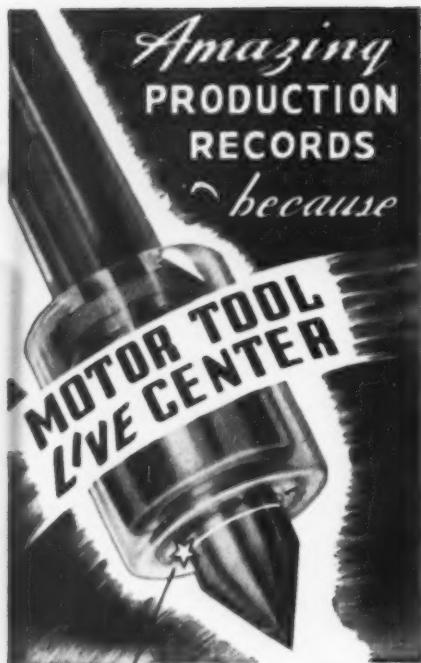
KENDEX  
STYLE 12  
PKD



KENNAMATIC  
STYLE SRI



SERRATED MILLING  
CUTTER BLADES



**is the ONLY Center  
with the  
OVERLOAD  
INDICATOR**  
*Look for the RED BAND*

You no longer have to guess whether you are overloading your live center thrust bearings if you use MOTOR TOOL LIVE CENTERS. When the load is too great the RED BAND around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the RED BAND is visible you are running COOL and SAFE.

**Send for**

**N E W descriptive folder . . . and verified case histories of how MOTOR TOOL LIVE CENTERS have out-performed and outlasted ALL other centers on exceedingly tough, continuous-run jobs.**

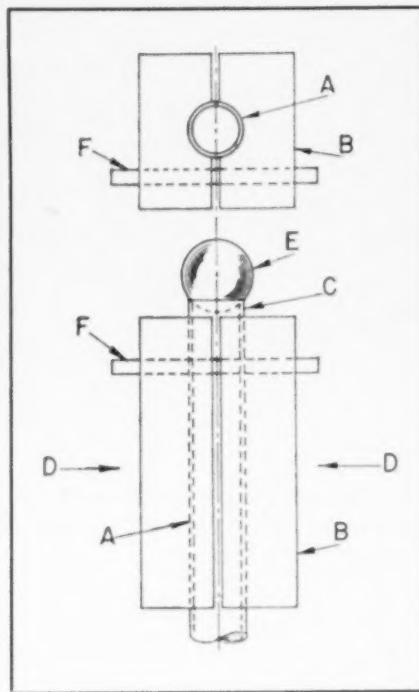
**MOTOR TOOL MFG.CO.**  
PO BOX 3805 PARK GROVE STATION DETROIT 5 MICH

*Make a Rule  
to Call Motor Tool*

## Simple Method for Flaring Ends of Tubing

By JOHN E. HYLER

IT sometimes becomes necessary in the shop to flare the ends of tubing in small lots. A simple method for performing such a job is shown in the accompanying sketch.



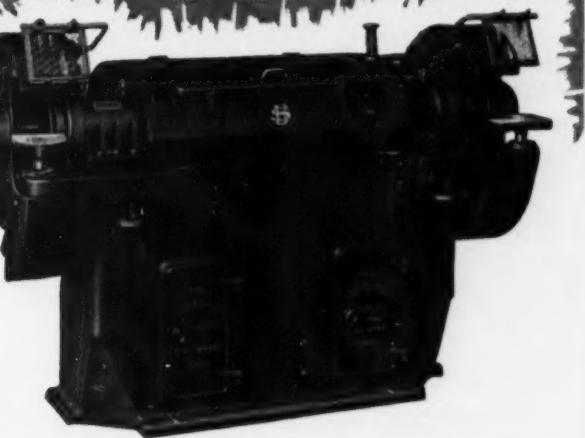
Sketch showing simple method for flaring ends of tubing

The tube to be flared, **A**, is held in an upright position in a special two-piece clamping block, **B**, which is clamped in a vise while the end of the tubing is being flared. The clamping block is made from a solid piece of steel which is drilled longitudinally with a hole of the same diameter as the tube to be

# America's Greatest QUALITY GRINDER VALUE



FREE FROM  
VIBRATION  
FOR UNIFORMLY  
QUALITY GRINDING



## U.S. ADJUSTABLE SPEED SNAGGING GRINDER Model 66

### THREE SPEED CHANGES

Feed this great grinder job after job . . . put it to the most grueling tasks . . . make the most exacting demands . . . and MODEL 66 will come through with flying colors every time.

Belt drive FREE FROM VIBRATION. Speed changes to compensate for wheel wear are made by elevating motor on its hinged tray. Patented safety device prevents over-speeding.

WHEEL GUARDS ADJUSTABLE TO WHEEL WEAR.

UNITED STATES ELECTRICAL TOOLS IN STOCK AT YOUR JOBBER

**The UNITED STATES ELECTRICAL TOOL Co.**  
CINCINNATI, OHIO

flared or slightly smaller. The block is then sawed in two longitudinally. The amount of material removed by the saw kerf prevents the resulting block halves from coming completely together when they are clamped on the tube so that the block provides a full, strong clamping action at all times.

However, before the block is sawed in two, a second smaller diameter hole

is drilled through it crosswise in such a position that it does not touch the main hole. A pin, F, is then inserted in the small hole, the pin having a rather easy push fit. This pin prevents the two halves of the clamping block from separating when they are removed from the vise and, in addition, keeps the ends of the two block halves in accurate register at the top to provide for quick and easy flaring of the tube.

In placing the tube in the clamping block, a small amount of its length is allowed to extend above the block, as indicated at C, so that it can be readily flared. The assembly is then placed between the vise jaws in such a manner that pressure is applied at points about mid-length of the block, as shown at D. After the tube has been properly clamped, a steel ball, E, is placed in the end of the tube, as shown. The steel ball is then subjected to repeated taps with a hammer on the top, which cause it to be driven down

## Severance DEBURRING CUTTERS



Unexcelled for power and hand deburring  
Sectional pattern teeth give shearing action

### Severance INSIDE DEBURRING CUTTERS

SECOND CHAMFER GROUP

Select 45° High Speed cutters from  
28 standard sizes and 30° cut-  
ters from 35 sizes—from  $\frac{1}{4}$ "  
to 3" diameters.

Both angles can be supplied in CARBIDE



HIGH SPEED CARBIDE

### MIDGET MILL GROUP

#### MIDGET MILLS



#### JUNIOR MILLS



#### LAB MILLS



### Severance OUTSIDE DEBURRING CUTTERS

SECOND CHAMFER GROUP



For speedy light deburring of rod  
ends and tubing O.D.'s, either off-  
hand or in screw machines. Select  
30° cutters from 14 standard sizes  
and 45° cutters from 10 sizes—up  
to 4 inch diameter.

Both angles can be supplied in CARBIDE

### OUTSIDE CHAMFERING MILLS

Operate in machines to perform  
heavy chamfering without chatter  
—in above size range and angles.



### TUBING GROUP

#### STANDARD Chamfering



SOLID  
(For Radius Up)

### HEADQUARTERS FOR DEBURRING AND CHAMFERING TOOLS DEVOID OF CHATTER

### Severance HAND DEBURRING CUTTERS



"A Twist of the wrist"  
easily bites off the bur left  
by drill or punch.

Ten standard sizes for  $\frac{1}{8}$  to 2" diameters.

Write for Bulletin 16-D

Complete REGRINDING Service — by New Tool Craftsmen  
— Savings are thus multiplied —

**SEVERANCE TOOL INDUSTRIES, INC.**

724 IOWA STREET

SAGINAW, MICH.

### COUNTERSINK GROUP

#### STANDARD



HEAVY DUTY



BALL SEAT REAMER

**LEPEL**  
*offers a  
New*

**DOES ALL  
THESE JOBS**  
Faster, Better  
and Cheaper  
  
BRAZING, SOLDERING  
HARDENING, ANNEALING  
DRAWING AND  
MELTING

**LOW COST  
High Frequency  
HEATING UNIT**

AT A PRICE SO LOW THAT NO MACHINE  
SHOP, TOOL ROOM OR LABORATORY  
CAN AFFORD TO BE WITHOUT IT!

• **SMALL and COMPACT**

Conveniently operated on bench or table  
— no mounting necessary.

• **ECONOMICAL OPERATION**

No special power installation required. Operates on 110 volts, 60 or 50 cycle line at unity power factor.

• **FULLY  
GUARANTEED**

Guaranteed for continuous duty cycle and stated performance.

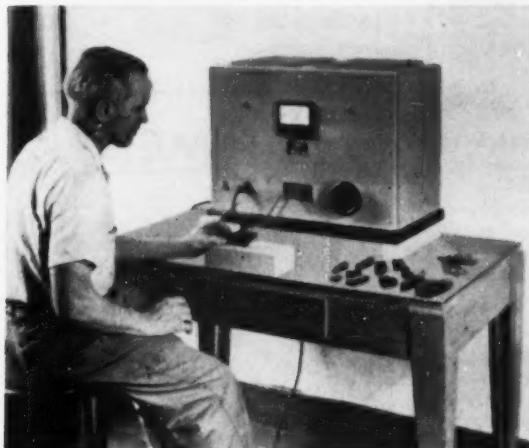
• **LOW COST \$780**

Complete unit with line connection and load coil f.o.b. factory

**WILL HEAT TO 1500° F.**

1/8" steel rod 1"	length in approx.	1 second
1/4" " "	" "	3 seconds
5/16" " "	" "	15 seconds
1/2" " "	" "	60 seconds

Will melt 4 ounces of brass or steel in 4 minutes.  
Equally well suited for heating of non-ferrous metals.



Unit illustrated brazing carbide tips to cutting tools. Shanks up to 1½" square can be satisfactorily brazed.



HARDEN



SOLDER

**Lepel**

HIGH FREQUENCY HEATING UNITS



BRAZE



MELT

LEPEL HIGH FREQUENCY LABORATORIES, Inc., 39 West 60th Street, New York 23, N. Y.

WRITE FOR LEPEL CATALOG MS-12



To give socket screw users the ultimate in strength, Brighton Nu-Process goes deep! In an entirely new metal working process, specially selected alloy steel is formed into screws with continuous unbroken fibers and fine, compact grain. This greater strength allows greater hardness, resulting in top quality socket screw products.

A complete stock of Brighton Nu-Process Socket Screw Products is carried for your convenience by progressive distributors in most localities. If your favorite mill supply house cannot furnish them, write for the name of your nearest distributor.

**GET THE FACTS — WRITE FOR YOUR COPY  
OF NEW CATALOG TODAY**

# BRIGHTON

**Screw & Manufacturing Co.**

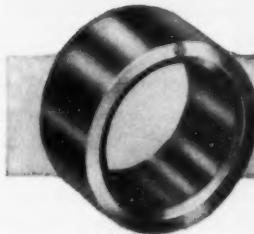
**Reading Road at Dorchester  
Cincinnati 2, Ohio**

into the tube, thus flaring the end of the tube.

In some cases, a ball peen hammer may be used in place of the steel ball to flare the tube end. In either instance, the size of steel ball or ball peen hammer used depends upon the size of tubing to be flared. If a hammer is used for flaring purposes, the hammer is not swung, as might be supposed, but rather two hammers are used. Posturizing a right-handed mechanic, the worker holds the ball peen hammer used for flaring in his left hand, with the peen resting down in the top end of the tube and with its flat striking face upward. Using the second hammer in his right hand, the mechanic then strikes the flat face of the ball peen hammer with a series of taps so as to flare the end of the tube to the desired shape.



*Dependable  
Available*



**A·S·A**  
STANDARD

UNEXCELLED FOR  
ACCURACY AND  
CONCENTRICITY



## ABC DRILL JIG BUSHINGS

HEADLESS PRESS FIT • SLIP RENEWABLE  
FIXED RENEWABLE • HEAD PRESS FIT

Also HEADLESS LINERS, LOCATING JIGS, LOCKSCREWS, CLAMPS



### REPRESENTATIVES:

BOSTON, MASS.  
M. A. Siebert Co.  
Garrison 7-0104

BUFFALO, N. Y.  
W. S. Gallagher Co.  
Garfield 5300

CLEVELAND, OHIO\*  
Die Supply Company  
UT 1-0550

DALLAS, TEXAS  
The Stanco Co.  
Riverside 5138

DAVENPORT, IOWA  
Davenport Engineering Corp.  
Davenport 2-1791

DAYTON, OHIO\*  
Geo. D. Laughter Co.  
Kenmore 4191

DENVER, COLO.  
Iver J. Esbenson Co.  
Main 3831

DETROIT, MICH.  
Diemaker Supplies Co.  
Trinity 1-2865

HOUSTON, TEXAS  
Chickering Tool & Equip't. Co.  
W. 6-8584

INDIANAPOLIS, IND.\*  
The Standard Die Supply, Inc.  
Riley 6319

NEW YORK, N. Y.  
Carl Eberhard  
Wisconsin 7-9193

MILWAUKEE, WIS.  
The Stone Company, Inc.  
Broadway 2452

MINNEAPOLIS, MINN.  
Chas. W. Stone Co.  
Geneva 8631

PHILADELPHIA, PA.  
Albert R. Dorn  
Delaware 6-3553

RHINEBECK, N. Y.  
Frank A. Hart  
Rhinebeck 437

ROCHESTER, N. Y.  
Tool & Die Supply Division  
D. J. Andrews, Inc.  
Baker 0843

SOUTH BEND, IND.  
Formrite Tool Co.  
South Bend 2-3396

STRATFORD, CONN.\*  
Ellsworth Steel & Supply Co.  
Bridgeport 7-3317

\*Stock of popular sizes maintained at these locations. Complete factory stock and warehouse at Garwood, N. J.

WRITE FOR CATALOG, PRICE LIST AND OTHER  
INFORMATION NEEDED BY THE TOOL ENGINEER

## ACCURATE BUSHING COMPANY

437 North Ave., GARWOOD, N. J. • W

2-2415



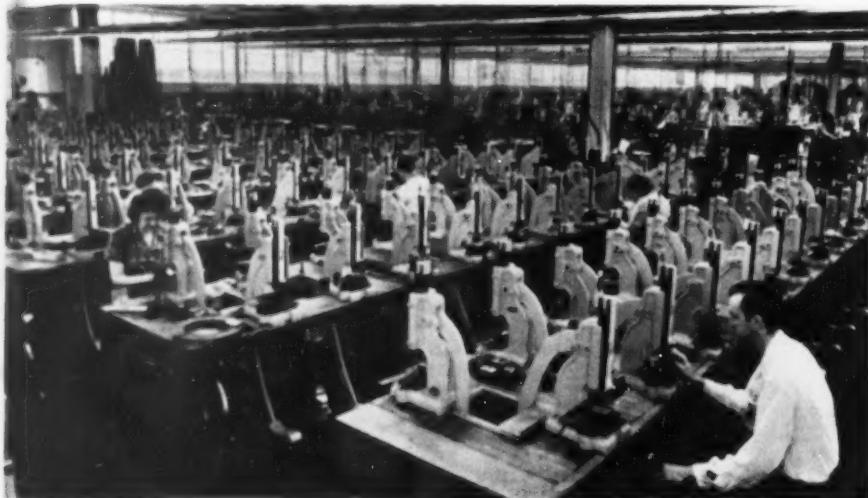
## *News of the Industry*

### **Research Laboratory to be Constructed Adjacent to New Tinnerman Plant**

Tinnerman Products, Incorporated, which formally opened its new \$2,000,000 plant in Cleveland recently, will soon construct a new research laboratory adjacent to the office section of the factory. George A. Tinnerman, vice president and general manager of the company, said the research laboratory will cost approximately \$200,000 and will facilitate the company's already extensive work in new development and engineering of its "Speed Nut" brand of fasteners.

Ultra-modern throughout, the new

plant, located in Brooklyn Village, a southwestern suburb of Cleveland, is a one-story structure of buff face brick and stone trim. Its production departments are decorated in pleasing, sight-saving colors, and all machinery has been painted in harmonious machine tool shades. One of the outstanding features of the plant is its large, modern cafeteria which can seat 500 persons at one time and can quickly be converted into an auditorium for meetings of as many as a thousand persons. A major factor in the plant's high efficiency rating is its straight-line production arrangement. Steel is received in a service wing on the east



View of the production area in the new plant of Tinnerman Products, Inc., Cleveland manufacturer of fasteners. In the foreground are foot-operated presses used in product development and small order production.

Flamatic hardening machine in actual production of parts for Buick Dynaflow, at the Metal Show, International Amphitheatre, Chicago. John Stout, research metallurgist at Buick; Phil Hewett, manager engineering department, Cincinnati Milling Machine Company; and Ken Youngdahl, machine operator, with a few of the many hundreds of visitors who saw the demonstration.

side of the building and is routed directly to the production rooms where it moves steadily north through heat treating and shipping to the loading docks at the rear of the plant.

The new plant is located on a 36-acre site which provides room for considerable additional expansion although a portion of the acreage has been set aside for future recreational facilities for employees.

#### Flamatic Hardening Demonstrated in Actual Production at Metal Show

Unique among exhibits at the Metal Show, International Amphitheatre,



Chicago, October 23-27, the Cincinnati Flamatic Hardening Machine No. 2 was demonstrated in actual production of parts for the Buick Dynaflow transmission. John Stout, one of Buick's metallurgists, was present at the start of the processing of 3000 hubs during the show, to test the hardness and hardness patterns of the Flamatic hardened hub and to ensure that all the parts processed would meet rigid specifications. David Strauchen and Milton Garvin, co-inventors of Flamatic, were in attendance during the five-day demonstration.

The Flamatic setup at the show was



#### Monarch Precision SHAPLANE Radius Tools

Illustration shows convex cutter for  $\frac{1}{4}$ " to  $2\frac{1}{2}$ " balls.

#### FIVE MODELS for LATHES, SHAPERS, PLANERS, BORING MILLS

Range  $\frac{1}{2}$ " to 3" for concave Radii. Also heavy duty models for radii to 6" on planers, etc.

Write for circular

C. B. TEETER, TOOL ROOM SPECIALTIES

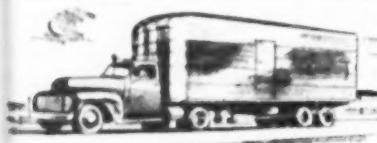
4470 Oakenwald Ave., Chicago 15, Ill.

a duplicate of the actual setup at the Buick Motor Car Company, and demonstrated Flamatic's ability to harden specified surfaces selectively and leave unaffected those areas to remain soft. Cincinnati Milling Machine Company personnel at the exhibit included Charles Reesey, Gar Fryer, Harry Charleston, William Crittenden, Ken Youngdahl, Phil Hewett, and George Schmetz.

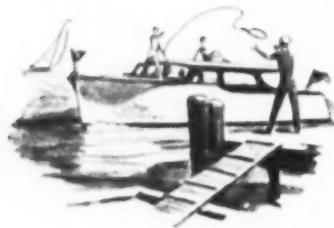
### Seventh Western Metal Exposition

More than 200 metal firms will display their new products and latest developments at the Seventh Western Metal Exposition to be held March 19 through 23, 1951, in Oakland, California's vast Auditorium and Exposition Hall. On the same dates, approximately 100 authoritative speakers will deliver papers on recent developments in making, working, fabricating, treating, and application of metals. These speakers will be heard at technical sessions of the Western Metal Congress, also to be held in Oakland.

## How Production-Wise Manufacturers SAVE SANDING COSTS



ON LAND



ON THE SEA

Whatever your product, chances are you can cut costs — do better work like this — with Jewel Coated Abrasives. See your distributor or write us now!

The gleaming stainless steel that makes up these modern truck trailer bodies is polished with BONDITE® Jewelox paper belts. Because they cut faster, last longer, Jewel Abrasive Belts can roll up sanding savings for you!

Torn covers on drum sanders were causing costly slow-downs in finishing plywood sheets for this boat builder. AP Sales Engineer recommended change to super-tough Jewel Bonder® Garnet Fibre Builder reports, "These Jewel drum covers are the best ever!"

\*Moisture repellent and heat resistant.

**Abrasive Products, Inc.**



SOUTH BRAintree BY MASSACHUSETTS MAKERS OF JEWEL COATED ABRASIVES

# Rod Grinding

## STRAIGHT RODS

1/32" to 1/2" Diameter

Diam. Tol. .0005" on Rods Up to 6' Long.  
Diam. Tol. .001" on Rods Up to 12' Long.

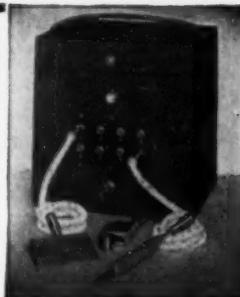
Quick Delivery  
High Quality

14 YEARS OF COMPLETE  
CENTERLESS SERVICE

COMMERCIAL  
**CENTERLESS**  
GRINDING CO.

6605 Cedar Ave., Phone: EN 3412, CLEVELAND 3, O.

MARK  
IRON,  
STEEL  
and  
CARBIDES



THE  
*Etchograph*  
WAY

Original Electric Etcher. Thousands in Daily Use

Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

• Write for circulars and prices.

**BREWSTER-SQUIRES CO.**

P. O. Box 191

Tenafly, N. J.



## For Simplicity in OIL GROOVING!

The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc.

This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

Write for Catalog.

Send parts  
for free  
grooving and  
production  
estimate

**Fischer Machine Co.**

316 N. ELEVENTH ST. — PHILADELPHIA 7, PA.

Established 1900



Architectural sketch of new plant of The Die Supply Co., Cleveland, Ohio

### Die Supply in New Plant

The Die Supply Company, Cleveland manufacturer of special die sets, formerly of 5349 St. Clair Ave., has moved into a new \$200,000 plant at 1400 Brookpark Road. Officers of the company are J. R. Fitzsimmons, chairman of the board; Warren H. Fitzsimmons, president; Joseph T. Fitzsimmons, vice president; and Robert E. Shaw, secretary and treasurer.

The 200 x 300-foot building is an attractive one-story modern unit of steel and buff brick construction. The building, containing 50 per cent more

floor space than the previous plant, was designed around production lines to obtain maximum efficiency. Greatly expanded facilities include additional machinery for manufacturing the company's "Die-Co" die sets, and increased capacity for inventory storage of tool, die, and machine shop accessories.

Fronting on Brookpark Road close to Willow Freeway, the new location simplifies quick, emergency deliveries both east and west, and the plant's three-acre tract affords ample parking for customers and visitors.

THE ACTUAL IS LIMITED | THE POSSIBLE IS IMMENSE

NEW LINCOLN PLANT CREATED BY INCENTIVE INSPIRED CO ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

### New Lincoln Accessories at NEW LOW PRICES

#### Insulated Electrode Holders

Unique "lock-jaw" construction on the LJ-1 gives extra strong grip, yet easy thumb release. Compact for welding in close quarters. Rated 250 amperes... handles  $\frac{1}{8}$ " to  $\frac{3}{8}$ " electrodes.

"INS" Holder. Light in weight, ruggedly built, self-ventilated. Rated 250 amperes, for electrode sizes  $\frac{1}{8}$ " to  $\frac{3}{8}$ ".

Lincoln insulated holders sell for less than often charged for replacement parts on other makes of holders.

#### High Flexibility Welding Cable

"Linconductor". Lincoln's new, low-priced, high quality welding cable. Copper strands encased in special paper wrapping allow strands to slip within the cable when bent sharply. "Stable-Arc". The industry's top standard of quality. Unsurpassed for long wear... for resistance to impact.

#### High Quality Welding Lenses

"Hi-Visibility". Lincoln's new, high quality, low-priced welding lens. Surpasses Federal specifications.

GET THE  
FACTS

Write for Bulletin 467, Lincoln Directory  
of Welding Supplies.

THE LINCOLN ELECTRIC COMPANY  
Dept. 255, Cleveland 1, Ohio

Sales Offices and Field Service Shops in all Principal Cities



## Heavy Duty • Bench Type ENGRAVING MACHINE

Interchangeable heads for engraving, electrical marking, and acid etching . . . available for all models. Also Panto engraving cutters, cutter grinders, master copy type, endless belts and accessories.



The PANTO  
MODEL UE-3  
SEVERAL OTHER MODELS AVAILABLE

H. P. PREIS ENGRAVING MACHINE CO.

657 Route 29 • Hillside, N. J.

Write for  
illustrated  
catalog

## STERLING DRILL GRINDER



CAPACITY:  
 $\frac{3}{8}$ " to  $2\frac{1}{2}$ " drills.  
 $5'' \times 9''$  adjustable table.

MOTOR:  $\frac{1}{2}$  hp.  
3450 rpm.

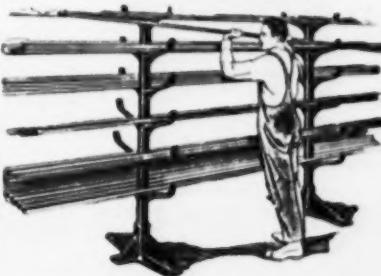
NET WT: 250 lbs.

CRATED: 320 lbs.

MCDONOUGH MANUFACTURING CO.  
EAU CLAIRE, WISCONSIN, U. S. A.

SPEEDS UP  
STOCK-ROOM SERVICE

The BROWN SECTIONAL RACK saves the time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time.



Any time you require additional storage space, all you need do is add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building.

It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist; depreciation is practically nil. SEND FOR BULLETIN No. 26-B DESCRIBING

BROWN'S QUICK-SERVE RACKS

**BROWN ENGINEERING CO.**

120 N. THIRD ST. READING, PA.  
RACKS • VISES • CLUTCHES • COUPLINGS

## Ex-Cello-O Wins Trophy for Best Annual Report

In the final ratings of the independent board of judges for the "Financial World" Survey of Annual Reports, Ex-Cello-O Corporation was judged as having the best annual report of the machine tool industry. The "Oscar of Industry" trophy was presented to Phil Huber, president of the company, at the Annual Awards Banquet in the

Grand Ballroom of the Hotel Statler, New York, on October 30, 1950.

More than 5,000 annual reports were submitted this year in the international competition, the tenth in the series



Phil Huber

of surveys, and these were judged in one hundred industrial classifications for the "Best-of-Industry" awards. The jury which made the final selections was headed by Dr. Lewis H. Haney, professor of economics at New York University. He was assisted by Carman Blough, research director of the American Institute of Accountants; Elmer Walzer, financial editor of the United Press; Mrs. Denny Griswold, publisher of Public Relations News; John H. Watson III, National Industrial Conference Board; and Guy Fry, president of National Society of Art Directors.

Weston Smith, executive vice president and originator of the Annual Report Surveys, presented the "Oscar of Industry" trophies at the Annual Awards Banquet, which was attended by more than 1,200 business and financial executives.

**ROTARY BLOWERS**  
for  
BLOW TORCHES  
Send for  
Circular

BUFFALO DENTAL MFG. COMPANY  
Buffalo 3, N. Y.

**DORMAN**  
AUTOMATIC REVERSE  
TAPPERS

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.
- No. 1 FRICTION DRIVE TAPPER—capacity No. 2-56 to  $\frac{1}{4}$ " in Steel— $\frac{1}{2}$ " in Aluminum.
- No. 2B POSITIVE TAPPER—capacity  $\frac{1}{8}$ " to  $\frac{7}{8}$ " in Steel.
- No. 3A POSITIVE TAPPER—capacity  $\frac{1}{2}$ " to  $\frac{15}{16}$ " in Steel— $\frac{1}{2}$ " to  $\frac{3}{4}$ " Pipe Taps.
- No. 4A TAPPER—capacity  $\frac{1}{8}$ " to  $\frac{1}{2}$ " in Steel including Pipe Taps.
- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from \$44.00 Write for Bulletin IMMEDIATE DELIVERY

THRIFTMASTER PRODUCTS CORPORATION  
Division of Thomson Industries, Inc.  
1034 N. PLUM STREET, LANCASTER, PA.

Quick Shipment on

**TAPER ATTACHMENTS**

For All Lathes—Old or New—  
9" to 24" Swing  
Write for Bulletin

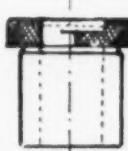
MASTER - TAPER COMPANY  
4531 N. Beacon St., Chicago 40  
Excl. Mfrs. of Taper Attachments

\$29.50  
to  
\$149.50

# DRILL JIG BUSHINGS

A. S. A. STANDARDS

- SLIP RENEWABLE
- FIXED RENEWABLE
- LINERS



- HEADLESS PRESS FIT
- HEAD PRESS FIT
- HEAD TYPE LINERS

## ALSO—MICRO DRILL BUSHINGS

No. 80 to 3-32" Hole Size

These Drill Jig Bushings are precision made of high grade tool steel.

All standard bushings are carried in New York stock for immediate shipment.

Write today for catalog giving standard bushings and prices.

**ACME TOOL COMPANY**

69 WEST BROADWAY

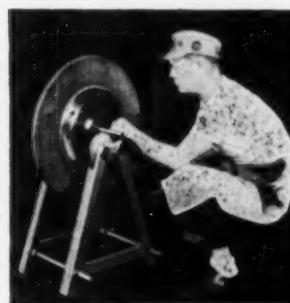
NEW YORK 7, N. Y.

Use *Anderson*  
**BALANCING WAYS**  
No Leveling Required

With Anderson Balancing Ways it is easy to balance any rotating object in a fraction of the time formerly required by other methods. Simply place the Ways on the floor or bench and they are ready to use without adjustments of any kind.

The revolving, chilled iron discs and the spindles, are ground and balanced to extreme accuracy. Spindle bushings are hardened—glass hard—yet without danger of breaking. This eliminates the possibility of wear or ball bearing indentations on spindles or bushings when heavy weights are placed on the ways.

They save time, save labor, and assure better work.



Swing	Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

Write for Bulletin 12-22

**ANDERSON BROS. MFG. CO., Rockford, Ill.**

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.

## **Large Technical Program Scheduled by A.S.T.E.**

A large technical program will highlight the 1951 annual meeting of the American Society of Tool Engineers to be held March 15 to 17 inclusive in New York City. Some 30 technical sessions are planned for the three days. Headquarters will be at the Hotel New Yorker.

In addition to the technical sessions, an extensive series of plant visits in

the New York area are being scheduled for inspection of outstanding production methods and equipment by attending tool engineers. Chairmen of the various New York host chapter committees in charge of the meeting plans include H. S. Hunt, Sipp-Eastwood Corp., host chairman; H. L. Horton, Industrial Press, chairman of technical activities, assisted by J. P. Schneider of National Twist Drill on plant visits, and J. L. G. Fitzpatrick, Fitzpatrick Company, in charge of technical sessions. Chairmen for other activities include Julius Schoen, chief engineer, Wetter Numbering Machine Co., and W. H. Lentz of Amerian Machine and Foundry Company.

"Production Know-how" subjects to be treated at the various technical sessions are being selected by the National Program Committee of the society on the basis of their importance regardless of the international situation at the time. The committee is headed by C. A. Rogers, Rudel Machinery, Incorporated.

**Best in the Country!**

BECAUSE THEY'RE

- WHIPSLEEVE SUPPORTED
- STRAIGHT-GROUND
- HIGH SPEED STEEL

**pivot**  
U.S. and Foreign Pat.

**punches**

**69,073,000 Standard Catalog Sizes and Types at Standard Prices.**

**PP**  
Free Catalog and Price List Write Dept. C.

"Pioneers in High Speed Steel Punches"

**PIVOT PUNCH AND DIE Corporation**  
373 OLD NIAGARA FALLS BLVD. NORTH TONAWANDA, N.Y.

## EMERY CORDS and TAPES



For  
Polishing  
And  
Burring  
Small  
holes,  
slots,  
dies,  
etc.

"The Machinist's  
Friend"  
Useful in many ways.

Available on spools in the following sizes  
and grits.

No.	Diam.	Grain	No.	Diam.	Grain
49	.082	120	60	.015	200
50	.070	180	66	.012	Cro.
51	.055	120	56	3-32	180
52	.055	150	57	4-32	180
53	.040	180	58	7-32	150
54	.030	200	59	9-32	150
55	.018	200			

Write for samples and prices

E. C. MITCHELL COMPANY  
MIDDLETON 8 MASS.

## IT'S ACORN BANDED THRUST BEARINGS



REGULAR  
OR  
SPECIAL  
DESIGN  
TO  
25" O.D.

For Quality, Dependability  
and Price

We also make Thrust Bearings inter-  
changeable with other manufacturers.  
We take in extra work on Blanchard  
Grinders.

Thrust Bearings Specialists  
For Over 30 Years

ACORN BEARING CO.  
66 Stanley St. New Britain, Conn.

Faster, More Efficient

Heat Treating

Quick Acting  
**JOHNSON FURNACES**



**JOHNSON HI-SPEED**

**No. 120**

Treat high speed steels

Harden high carbon steels

Braze carbide tipped tools

\$14550

P.O.B. Factory

Compact, powerful, and remarkably economical in operation. JOHNSON Hi-Speed No. 120 reaches 1500°F. in 5 minutes. Delivers 2300°F. in 30 minutes. Easily regulated. Holds temperature at desired level for accurate heat-treating any steels. Ideal for small metal parts. Gets the job done fast to save time and gas. Firebox 5x7½x13½. Complete with Carbofrax Hearth, G.E. Motor and Johnson Blower. Order Today!

There is a Quick-Acting JOHNSON Unit for every toolroom and shop

**WRITE FOR FREE CATALOG**

**JOHNSON GAS APPLIANCE CO.**  
571 E AVE. N.W., CEDAR RAPIDS, IOWA

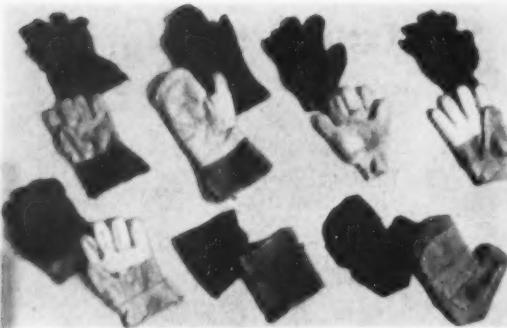


Illustration showing work gloves and other protective hand coverings before and after reconditioning

### Work Glove Reconditioning Service

A new work glove reconditioning service is now being offered on a national basis by the U. S. Industrial Glove Corp., 9350 Roselawn Ave., Detroit 4, Mich. The service includes complete renovation, sanitizing, and pack-

aging of all types of wornout fabric and leather gloves and protective clothing. Special equipment and methods have been developed for performing the unique operations.

It is reported that many wornout work gloves which heretofore were discarded can be salvaged with the new process. Moreover, many gloves can be salvaged several times. Under the plan, the company offers complete transportation, at no additional expense, in all industrial areas. Fireproof containers can be furnished.



In This Case, It's Not a Storage Bin . . .

### THE D. P. S. HOPPER UNIT

is a SELECTIVE FEEDING DEVICE whereby production parts are selected, oriented and fed in a given position for primary and secondary operations.

It is the result of years of experience in solving feeding and assembling problems, speeding production, reducing costs and eliminating the manual handling of parts. D.P.S. Hopper Units are widely adaptable to Presses, Centerless Grinders, Thread Rolling and Slotting Machines and special machines. They do a precision job of feeding screws, screw blanks, rivets, pins, nuts, discs, washers, steel balls, etc. Sizes 8", 10", 12", 16", 24" and 30" diameters. Let D.P.S. Hoppers prove their indispensability in your plant.



Send for Catalog and further details

**DETROIT POWER SCREWDRIVER CO.**

2807 W. FORT ST.  
DETROIT 16, MICH.

# BAUMBACH

THE FIRST IN  
DIE SETS



Being originators of Standard Die Sets naturally we are steps ahead in Design—Precision—Dependability and Economy. Baumbach Die Sets can be disassembled. The Leader Pins and Bushings can be used on other size Die Sets—reducing inventorying a lot of Die Sets. Costly machining time is also reduced. Learn all about Baumbach advantages before you buy. Write for circular.

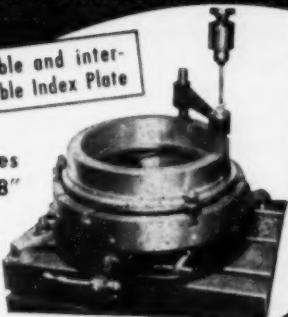
E. A. BAUMBACH MFG. CO.  
1806 S. Kilbourn Ave. • Chicago 23, Ill.

Eliminate Costly Jigs  
with a TROYKE  
BALL BEARING INDEXING TABLE

Removable and inter-  
changeable Index Plate

Three Sizes  
12"-15"-18"

Also  
Wormwheel  
Operated  
Rotary  
Tables  
9" - 25"



See your dealer or write  
for Catalog No. 14

Troyke Mfg. Co. Inc.

Cincinnati 9, Ohio, U.S.A.



## SAWMASTER HACK SAW



LOW PRICED

PORTABLE  
SELF-CONTAINED

READY TO WORK

Angle  
Cutting  
Vise  
**STURDY**  
ECONOMICAL

Write for Bulletin  
No. 300

**MILLER-KNUTH MFG. CO. OMAHA, NEB.**

**Gear Nomenclature Standard  
Approved by A. S. A.**

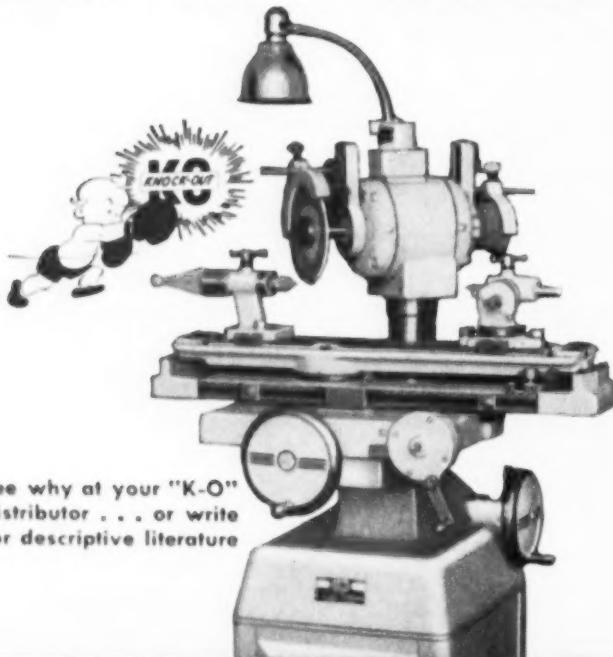
An American Standard Gear Nomenclature, Terms, Definitions, and Illustrations, B6.10-1950, has been approved by the American Standards Association. The standard was prepared by a committee representing manufacturers, users, and independent experts to help bring about the use of uniform

terminology in offices, shops, and textbooks. It provides a system of terms and their meanings grouped as a logical series rather than in alphabetical order, and also includes illustrative figures which can be referred to in investigations and discussions of gear problems.

Many of the definitions have been written in a way that makes them depend on one another. Thus, there is a line of relationship back from pitch diameter to top circle, to pitch cylinder, and to pitch surface. This method of arrangement leads to a more comprehensive understanding of the concepts and geometrical relations.

The American Standard Gear Nomenclature, Terms, Definitions, and Illustrations is available from either the American Standards Association, 70 E. 45th St., New York 17, N. Y., or from the American Society of Mechanical Engineers, 29 W. 39th St., New York 17, N. Y., at \$1.50 per copy.

**There's a reason . . . 85% of all  
popularly-priced Tool and Cutter  
Grinders sold are "Knock-outs"**



See why at your "K-O"  
distributor . . . or write  
for descriptive literature

**K. O. LEE CO.**

**ABERDEEN, SOUTH DAKOTA**

**YOU PROFIT** on every job you send to Rutland!



Rutland reworked or repaired cutting tools are guaranteed to give new tool performance—at a fraction of the new tool cost.

Recutting • repairing • replacing Carbide tips. Special tools from obsolete or standard tools, etc.

Call or Write

### Rutland TOOL SERVICE

1617 E. McNichols • Detroit 3, Mich.  
TWINbrook: 3-6240

### FALLS ROTO CENTER

Provides



GREATER  
TURNING ACCURACY  
at HIGH SPEEDS

Precision construction and bearing arrangement of Falls Roto Center allows tailstock center to rotate with the work and retain "dead center" accuracy and rigidity.

Two precision quality heavy-duty Roller Bearings, perfectly matched, give smooth, anti-friction rotation at highest speeds. Result is extreme accuracy at maximum production rate.

Write for complete facts in  
Bulletin MM today.

### FALLS PRODUCTS, INC.

124 Genoa St. Genoa, Ill.

## NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

### NEW MODEL 70

Multi-Wheel Numbering Machine  
MACHINE AND SHANK ALL ONE PIECE



The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20.

Bulletin MS-70

#### IMPROVED TYPE HOLDERS

Hand or Press style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . Just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: 1/32" up to 1/2" figures and letters.

Write for  
Bulletin  
MS23H



NUMBERALL STAMP & TOOL CO.  
HUGUENOT PARK - STATEN ISLAND 12, N. Y.

## Pivot Punch and Die Expands

Robert H. King, vice president and treasurer of Pivot Punch and Die Corp., North Tonawanda, N. Y., has announced the completion of an expansion program which has doubled the size and productive capacity of the company. The purchase of the entire building at 365-373 Old Niagara Falls Blvd. and the installation of new equipment and production methods

have also necessitated increasing the number of employees from 60 to 120. Ideal working conditions are provided through new ventilation control, non-glare lighting, work-level production flow, and numerous other facilities. New equipment which facilitates the production and assembly of even larger dies and tools than heretofore achieved includes a 5-ton crane over a 60-foot span, and a complete line of equipment for layout, heat treating, testing, and inspecting, as well as metal cutting and finishing.

Robert H. King



**GRAY TURRET HEAD METAL CUTTER OR NIBBLER**

**N.A.M.** Pioneer Award Given to Gray

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

**GRAY MACHINE CO.**  
Box 596, Philadelphia, Pa.

## RECLINABLE POWER PRESSES



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

Our catalog contains a wide variety of press types and sizes. Write for it today.

Year serving worldwide industry  
with Patent Percussion, Open Back, Double Crank, Punch, Horn, and Toggle and Straight Side Presses, Dial and Roll Feeds.

**ZEH & HAHNEMANN CO.**  
198 VANDERPOOL ST., NEWARK 5, N. J.

Mr. King has also announced that Pivot Punch and Die Corporation has completed national service arrangements through the establishment of manufacturers' representatives from coast to coast.

## Gray Iron Society Elects New Officers

At the Gray Iron Founders' Society's 22nd Annual Meeting held recently in Cincinnati, Ohio, the following officers were elected for 1950-51:

### READING BENCH KEYSEATER

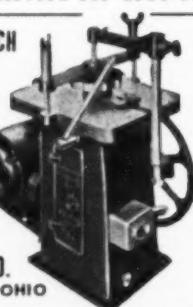
Portable — move directly to job; a time saver for both small and large shops.

3 1/2" stroke; adaptable for other work.

Low first cost — prompt delivery.

Good dealers wanted.

**READING MACHINE CO.**  
READING (Cincinnati) OHIO



**WANTED** Most FOR HIGH ACCURACY  
STAMPING OPERATIONS

**V & O**  
LONG SLIDE  
Precision  
POWER  
PRESSES

Available in  
sizes from 3 to  
105-ton capacity.

**THE V & O PRESS COMPANY**  
DIVISION OF HARTFORD-EMPIRE COMPANY  
Builders of Precision  
POWER PRESSES and FEEDS  
Since 1889 HUDSON, N.Y.  
WRITE FOR CATALOG

**EISLER**  
JIG  
BORING



### CAM MILLING

A SPECIALIZED

ROWBOTTOM CAM

MILLING SERVICE . . .

JIG BORING . . . SPOT

WELDING . . . CON-

TRACT PRODUCTION

. . . EXPERIMENTAL

DEVELOPMENT

EISLER ENGINEERING CO., Inc.  
774 So. 13th St. Newark, N.J.



**Hammond**  
**WET** or  
**DRY**  
**CARBIDE**  
**TOOL GRINDERS**

HAMMOND Carbide Tool Grinders will soon pay for themselves through greater wheel economy, longer tool life and faster grinding.

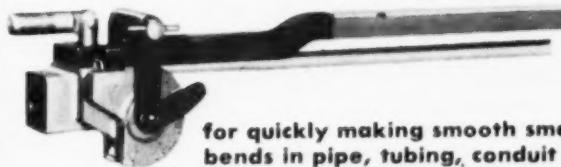
AMERICA'S MOST COMPLETE LINE.

6", 7", 10", 14" Wet or Dry—  
also Chip Breaker and Diamond Finishing Grinders.

**WRITE FOR CATALOG 220**

*Hammond Machinery Builders*  
1615 Douglas Avenue Kalamazoo, Michigan

## GREENLEE HAND BENDER



for quickly making smooth small-radius  
bends in pipe, tubing, conduit

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND  
BOOKLET E-201. Complete  
facts and prices on the Greenlee  
Bender line. Write Greenlee  
Tool Company, 1994 Herbert  
Avenue, Rockford, Illinois.



# CHICAGO STEEL PRESS BRAKE

**Model No. 131**



**A new member of the Chicago Press Brake family designed to supplement the larger machines.**

**Within its rated capacity (11 tons) all operations are handled same as on the larger machines.**

**All steel construction, enclosed gearing.**

**Takes up small floor space.**

**We can make excellent deliveries of this new press.**

**We make complete line of dies for all Press Brakes.**



**Send for Bulletin 131 for further description**

**DREIS & KRUMP MFG. CO.**  
7418 LOOMIS BLVD. • CHICAGO 36  
ILLINOIS

E. L. Roth, Motor Castings Co., West Allis, Wis., president; R. C. Schaefer, Schaefer-Goodnow Foundries, Inc., Pittsburgh, Pa., vice president; J. S. Parrish, Jr., Richmond Foundry & Mfg. Co., Richmond, Va., secretary; and H. J. Trenkamp, The Ohio Foundry Co., Cleveland, Ohio, treasurer.

New directors elected to the board of directors were W. O. Larson, W. O. Larson Foundry Co., Grafton, Ohio; G. I. Gilson, J. E. Gilson Co., Port Washington, Wis.; and G. E. Mellow, Liberty Foundry Co., St. Louis, Mo. Incumbent directors H. L. Edinger, Barnett Foundry & Machine Co., Irvington, N. J.; R. G. Schaefer, Schaefer-Goodnow Foundries, Inc., Pittsburgh, Pa.; and S. D. Russell, Phoenix Iron Works, Oakland, Calif., were re-elected to serve two-year terms.

## Engineering Companies to Mobilize

A general mobilization meeting of engineering companies will be held in Detroit, Michigan, on December 12, 1950. Sponsored by the National Association of Engineering Companies, the meeting is open to non-member as well as member companies.

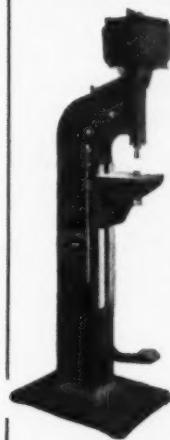
The industry comprises some 1,500 companies in the United States which do engineering or design work on either mechanical products, machines, or tools or which do production, process, or methods engineering. At the meeting, advisory committees representing all engineering companies will be organized to cooperate with various government agencies in line with the 1950 Defense Production Act.

President of the association is Harry L. Murray, Murray Engineering Company, Detroit. A Stewart Kerr is executive secretary.

# RIVETING?

for

## FAST RIVETING WITHOUT NOISE



Put your production jobs on Linley Spinner Type Riveting Machines. No hammering! They spin rivet with twin rollers. In most cases the actual riveting time is one second per rivet, so that you can watch costs come down while noise is entirely eliminated! Direct Motor or Vee-Belt Driven. Bench or floor types.

Send samples of your work for free riveting, cost of equipment and true estimate on production.

**LINLEY BROTHERS CO.**

671 STATE ST. EXT. BRIDGEPORT 1, CONN.

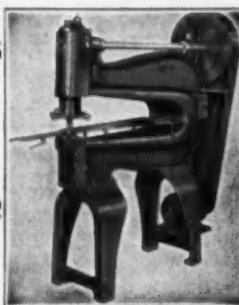
# SAVAGE

NIBBLING  
MACHINE

NIBBLE  
YOUR COSTS

Ask for  
Free Bulletin "H"

Capacity 4"  
mild steel



FOR TUBE SLOTTING, TUBE SHAPING  
AND CUTTING FLAT SHEETS BY TEM-  
PLATE OR TO A SCRIBED LINE.

Manufactured by

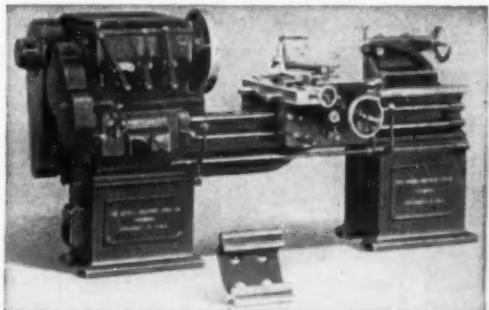
**W. J. SAVAGE COMPANY**  
Knoxville Tennessee

Since 1885

Pioneer Mnfrs. of Nibbling Machines

## NEBEL Removable Block Gap Lathes

Gear Head Motor Driven Type, 3 Step Cone Double Back Gear Belt Driven Type or with Motorized Headstock. Especially adapted for repair and maintenance as well as for genera manufacturing. Handle a large variety of work with large swing through the gap.



All Geared headstock type completely equipped with Timken Bearings, headstock completely enclosed, running in oil, with motor mounted on rear of lathe, drive through multiple vee belts and friction clutch. Standard equipment consists of: Quick change gear box, compound rest, steady rest, chasing dial, face plate, driver plate, wrenches, tool post and centers.

Furnished in four different sizes as follows: Series "LN" 18/27", Series "A" 20/30", Series "B" 22/34", and Series "D" 25/40".

**The Nebel Machine Tool Co.**  
CINCINNATI OHIO

## Conveyor Equipment Manufacturers Association Elects Officers

L. B. McKnight, vice president, Chain Belt Company, Milwaukee, was elected president of the Conveyor Equipment Manufacturers' Association at its 17th annual meeting held recently at White Sulphur Springs,

W. Va. He succeeds John M. Alvey, president, Alvey Conveyor Manufacturing Co., St. Louis.

Other officers elected are: G. W. Ostrand, general manager, Caldwell Plant, Link-Belt Company, Chicago, vice president; Earl D. Stearns, general manager, Conveyor Division, Barber-Greene Co., Aurora, Ill., treasurer; and Lee Sekulski, sales manager, Mathews Conveyor Co., Ellwood City, Pa., secretary. In addition to these officers, the following were elected to serve on the association's executive committee: J. E. McBride, vice president, Palmer-Bee Company, Detroit; J. A. Jeffrey, vice president, Jeffrey Mfg. Co., Columbus; and Merrill E. Pratt, president, Continental Gin Company, Birmingham, Ala. R. C. Sollenberger was re-elected as executive vice president. The headquarters of the association under his direction are located at 1129 Vermont Ave., N. W., Washington 5, D. C.

## BLUE LAYOUT DOPE



Speeds layout on all metals. Dries fast. Oil resistant. Won't chip, crack or flake off. Comes in handy 8 oz. brush-in cans, pts., qts., drums. Order now! SAMPLE FREE!

TAMMS INDUSTRIES, INC.  
228 N. LaSalle St. • Chicago 1, Ill.

## Made for PRECISION ACCURACY



Every Smith Surface Plate is a true master plate—with precision lapped surface, relieved by hand flaking to provide the maximum number of uniform bearing points to meet gauge makers' requirements and to prevent gauges and the like from "freezing". Aircraft and Ordnance plants, demanding the greatest accuracy in surface plates, reorder many times. Write for new descriptive literature.



SMITH TOOL & ENGINEERING CO.  
Precision Measuring Equipment  
3855 W. 150th ST., CLEVELAND 11, OHIO

Smith  
**MASTER**  
SURFACE  
PLATES

AVAILABLE  
SIZES  
8 x 12  
9 x 14  
12 x 18  
16 x 18  
18 x 24  
24 x 24  
20 x 30  
24 x 36  
30 x 36  
30 x 60  
36 x 68  
OTHER  
SIZES MADE  
TO ORDER

## A. S. T. E. Charters 86th Chapter

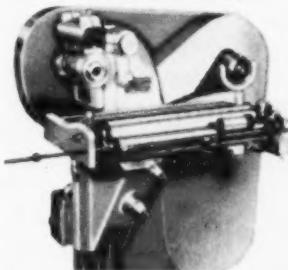
The American Society of Tool Engineers chartered its 86th chapter in Dover, N. H., at a meeting of 57 charter members in American House Hotel. Elected at the meeting were officers from three states—New Hampshire, Maine, and Massachusetts. Chairman is John A. Woodman, me-

That  
**EQUI-GRIP**  
Basic Fixtures  
can  
save  
you  
much

PRODUCTION TIME and FIXTURE EXPENSE  
IS PROVED BY THE MANY REPEAT ORDERS  
FROM SATISFIED CUSTOMERS.

**GEORGE - ANDERLE MFG. CO.**  
1709 BRANDT ST. DAYTON 4, OHIO

Ideal for high-speed, low-cost semi-automatic production when equipped with air or hydraulic power feeds.



### **U. S. No. 1 MILLING MACHINE**

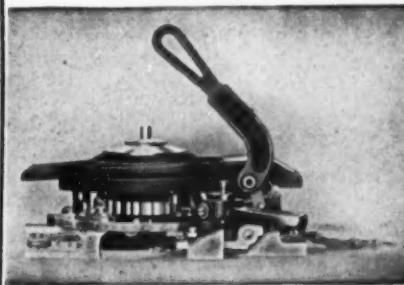
The number one value in medium size all purpose milling machines. Hand or power feed. Send for information.

### **The U. S. MACHINE TOOL CO.**

A Division of

U. S. Burke Machine Tool Co.  
22 East 72nd St., Cincinnati 16, Ohio

### **AUTOMATIC CHUCKING AND INDEXING FIXTURE**



- 1.—1800 light cuts per hour.
  - 2.—Either horizontal or vertical position.
  - 3.—Collects changed instantly.
  - 4.—Automatically knocks piece out.
- Model D—Ratchet indexing only—1" cap.  
Model E—Both degree and ratchet indexing  
Capacity up to 1".  
Model F—Both degree and ratchet indexing  
Capacity up to 2½".

Write for Folders

**J. W. DEARBORN • Ansonia, Conn.**

## **MICO ENGRAVERS**

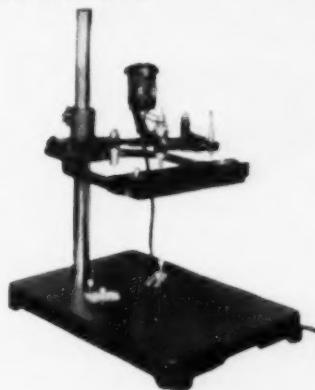
**For Metal, Plastic, Glass or Wood**

4 Reduction Ratios, 1.5:1 to 4:1.  
Ball-bearing Spindle with Micrometer Adjustment.



**Cat. No. 252**

For engraving nameplates, panels, machined parts or 3-dimensional reproduction of dies and molds.



**Cat. No. 253**

For engraving large panels and instruments. Will take work up to 19" wide by 19" high and any length. Larger areas can be accommodated by placing pantograph and yoke directly on work.

*Send for Illustrated Catalogue*

**MICO INSTRUMENT CO.**

76 TROWBRIDGE ST., CAMBRIDGE, MASS.

chanical superintendent at General Electric Company's Somersworth, New Hampshire plant. Walter H. Harrington of the New Hampshire Technical Institute at Manchester, N. H., was elected first vice-chairman, with Walter Edwards, partner, Hodgdon-Edwards, South Berwick, Maine, as second vice-chairman. John N. MacInnis, chief industrial engineer, Clarostat Manufacturing Co., Dover, was

named secretary, and James D. Wilson, field engineer of Johnson-deVou, Inc., Worcester, Mass., was elected treasurer.

I. F. Holland, Pratt and Whitney Division, Hartford, past president of the national society, presented the charter. Also participating in the installation were V. H. Ericson, Worcester, Mass., a director of the A. S. T. E., and H. E. Conrad, executive secretary of the society. John Teulon of the New Hampshire State Planning and Development Commission was the speaker at the meeting.

## A PRECISION LAPPING MACHINE with a

*Self-Conditioning  
Lapping  
Plate*



### AN ENTIRELY NEW LAPPING PRINCIPLE

This revolutionary self-conditioning lapping machine will lap parallel to any surface finish and flatness. It handles parts of almost any size, shape and thickness—in a wide variety of materials. The lap plate is readily accessible, lapping compound is uniformly distributed and automatic control eliminates all hand lapping operations.

*Every machinist and production engineer should know about this new method. It's described in this new free booklet.*



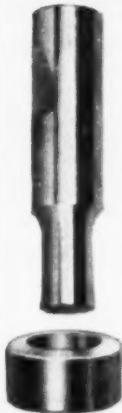
**JOHN CRANE** **CRANE PACKING COMPANY**  
LAPMASTER DIVISION • CHICAGO 13, ILL.  
1805 Cuyler Avenue



### Heads AAF Pacific Division

John Hellstrom, vice president of the American Air Filter Co., Inc., Louisville, Ky., has moved to San Francisco to become manager of the company's newly created Pacific division. Under his direct supervision will be the business activities of both the American Air Filter Company and its Herman Nelson Division of Moline, Illi-

## PUNCHES AND DIES



- ROUNDS
- SQUARES
- OVALS
- RECTANGULARS

It will pay you to try Spengler Punches and Dies. Many stock sizes available for immediate shipment. Special punches and dies promptly made to order. For further information and list of stock sizes write:

**GEO. H. SPENGLER CO.**  
640 RACE STREET  
ROCKFORD, ILL.



**FLEXLOC**

ONE-PIECE

## SELF-LOCKING NUTS

The FLEXLOC is one-piece, all-metal . . . has ample tensile and long life. It is a Stop and Lock-Nut that can be reused many times. Its "chuck-like," resilient locking segments lock the FLEXLOC securely in any position on a threaded member. It positively "won't shake loose," yet can be removed easily with a wrench.

Write for Catalog 619, it's full of information.

**STANDARD PRESSED STEEL CO.**  
JENKINTOWN 22, PENNSYLVANIA

## Make A Clean Impression!

### HAND-CUT

### STEEL STAMPS Letters & Figures



Deep, hand-cut letters in special-formula steel assure clean impressions and long service. Face of stamp is angled for extra strength. Chamfered corners for locating the base. Ask for Hoggson Brand at mill supply houses.

**HOGGSON BRAND**  
*Since 1849*

**HOGGSON & PETTIS MFG. CO., New Haven, Conn.**

inois, in the Pacific territory. The Pacific division includes the offices and representatives in the states of California, Oregon, Washington, Idaho, Montana, Utah, Arizona, New Mexico, and the western part of Texas.

Mr. Hellstrom is one of the pioneers of air filtration and dust control. He was president of Midwest Air Filters, Incorporated, up to the time it was merged with several other companies

to form the American Air Filter Company of which he became vice president in charge of the dust and fume control division. Mr. Hellstrom was president of Foundry Equipment Manufacturers' Association this past year. One of his assistants will be Robert H. Walpole, who for the last four years has been engineering supervisor of the company's dust and fume control division with headquarters in San Carlos, California. Mr. Hellstrom will be located in the Standard Oil Bldg., 225 Bush St., San Francisco, California.

...for more than  
**1001 jobs**



HJORTH LATHE & TOOL CO.  
8 BEACON STREET WOBURN, MASS.

SAWING  
FILEING



GROB  
BROTHERS  
GRAFTON WISCONSIN

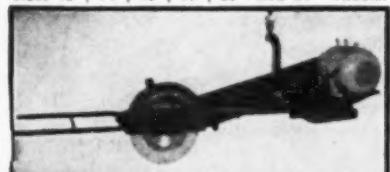
### Two Westinghouse Engineers Honored by American Welding Society

Two Westinghouse metal joining engineers were honored recently at the annual meeting of the American Welding Society held at the Hotel Sherman, Chicago, Illinois. The engineers are C. H. Jennings, engineering manager of the welding department at the company's Buffalo, New York plant, and J. W. Kehoe, section engineer of the metals joining laboratory at the East Pittsburgh, Pennsylvania works.

Mr. Kehoe was awarded the \$750 top prize in the 1950 Resistance Welder Manufacturers Association Prize contest, and Mr. Jennings was chosen as

### MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



Ask for Descriptive Circular  
MUMMERT-DIXON CO.  
120 Philadelphia St. • Hanover, Pa.



# CAMS

Specially Designed  
Exclusive Duplicating Process  
ONE CAM OR A QUANTITY

Send Specifications for Quotation  
**L. G. SCHLECHT & SON, INC.**  
1628 N. Astor St. Milwaukee 2, Wis.  
Est. 1919

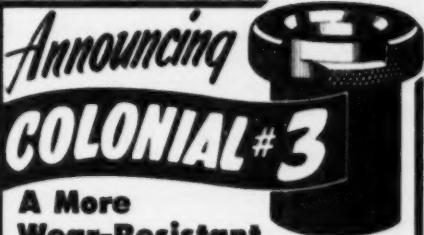


**Remove burrs!  
Chamfer holes!**

## NOBUR TOOLS

Industry's unmatched tool for  
**FAST, COST-REDUCING  
PRODUCTION**  
WRITE TODAY  
**NOBUR MANUFACTURING CO.**

317 North Victory Blvd., Burbank, Calif.



## Announcing COLONIAL #3

### A More Wear-Resistant

#### Drill-Jig- Bushing Steel

- 
- Fully  
Field-Tested
- 

To reduce your  
bushing costs, specify  
bushings made from  
"Colonial #3".

All standard CO-  
LONIAL drill jig  
bushings are now  
made from Colo-  
nial #3—a new oil-  
hardening steel  
having many times  
the wear-resistance  
of former bushing  
steels. Also gives  
greater uniformity.

**COLONIAL** BUSHINGS INC.  
P.O. BOX 27 HARPER STATION  
DETROIT 13 MICHIGAN

*Leaders over 50 years*  
Established 1899

**TOOL  
CRIBS and  
PARTITIONS**

Standard Sections Woven Wire Mesh Panels and  
Doors to enclose Tool Cribs, Stock rooms and other  
enclosures.

IMMEDIATE DELIVERY      Write for Catalog

**Acme Wire & Iron Works**  
3527 E. Canfield — Detroit 7, Mich.

the 1950 Adams lecturer by the society. Mr. Kehoe's award was based on his technical paper describing a practical method for obtaining consistently good resistance welds, and Mr. Jennings' lecture discussed the dynamic characteristics of direct current welding machines. Mr. Kehoe is the chairman and Mr. Jennings a member of the metals joining committee of Westinghouse, which coordinates welding procedures in company plants throughout the country.

#### Elected Director of Bullard Company

Frank U. Hayes, sales manager of The Bullard Company of Bridgeport, Connecticut, has been elected a director of the company to succeed E. P. Blanchard, formerly director of sales, who retired recently after 30 years with the company. Mr. Hayes joined

Bullard in November of 1935 and, after a few months in the plant, became associated with the sales department having the Middle Atlantic states as his territory. In 1941 he was assigned as



Frank U. Hayes

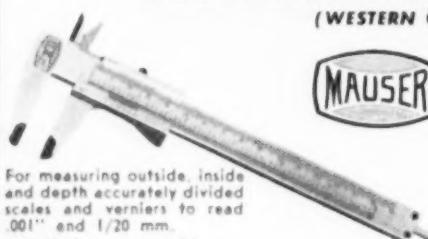
technical advisor with the Tool Section of the Production Division of the Office of Production Management. Upon his return to Bullard, he organized the subcontracting division which carried on throughout World War II.

In 1942, Mr. Hayes was named assistant sales manager and held this position until July 1947 when he was appointed sales manager.

## MAUSER-TYPE PRECISION VERNIER CALIPERS

MADE BY MESSZEUGBAU OF BOLL/OBERNDORF

(WESTERN GERMANY)



For measuring outside, inside and depth accurately divided scales and verniers to read .001" end 1/20 mm.

\$14.00 list, post paid.

Cat. No. 30-64

Ask about our 10 days' free trial.



FORMERLY

NOW



NOTE: The well-known Mauser Caliper factory has been dismantled by order of the occupation authorities and many of the Mauser technicians have re-established the production of these calipers under the name of Messzeugbau. Highest quality and precision—in the Mauser tradition—are therefore guaranteed.

## INTER-CONTINENTAL TRADING CORPORATION

90 WEST STREET

NEW YORK 6, N. Y.

## Why THOR STAMPS Last Longer



. . . because they're made of a special, correctly-heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

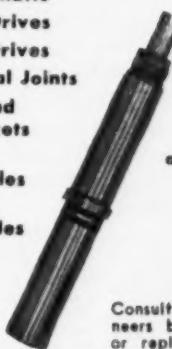
You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

**The Pittsburgh Stamp Co., Inc.**  
812 CANAL ST. • PITTSBURGH, PA.

## SEIBERT DRILLING MACHINE PARTS

Pinion Shafts  
Upper Drives  
Lower Drives  
Universal Joints  
Arms and Brackets  
Slip Spindles  
Bracket Spindles

Spindle Extension Assemblies



Morse Taper Adapters With and Without Set Screw Slots

Shur-Lock Micro Nuts

Consult SEIBERT engineers before retooling or replacing parts on multiple spindle machines.  
(New Low Prices)

**SEIBERT**  
*Quality*

Manufactured by  
**Seibert & Sons, Inc.**  
E. Peoria 8, Ill.

# Chicago MOUNTED WHEELS

**First and Finest —**  
and Still the Leader!

Chicago Mounted Wheels really cut, don't just rub — can do a real time-saving job in your shop. Portable tools become precision instruments for grinding and polishing . . . with valuable "down time" hours avoided. Specify Chicago Mounted Wheels, backed by more than 57 years of abrasive specialization and research.



Offices and stocks located in principal industrial centers.

**CHICAGO WHEEL & MFG. CO.**  
Dept. MMS, 1101 West Monroe Street, Chicago 7, Illinois

Write today for Free Catalog, plus details on Free Engineering Service.

## Columbia Completes \$100,000 Warehouse

Columbia Tool Steel Co., Chicago Heights, Ill., producer of high speed alloy and carbon tool steel for industrial production, has announced the completion of a \$100,000 branch warehouse located at 121 Oakman Blvd., Detroit. The company has now moved into the new facility from its former Howard Street location which it occupied for 20 years.

The new building consists of a sales office and distributing warehouse and is approximately 6,000 square feet in area. It stocks about 2,000 items of the standard types of tool steel. Equipment includes horizontal type racking, overhead crane, and a battery of equipment for cutting the steels. S. E. Sjogren, vice president of the company, is in charge of the warehouse.

SEND FOR FREE CATALOG TODAY



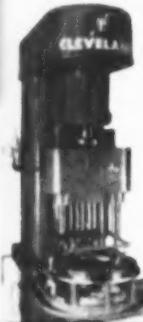
QUARTER TURN SCREWS  
SHOULDER SCREWS  
DOUBLE END HG FEET  
SCREW TYPE JIG FEET  
FLANGED NUTS  
CUT THREAD STUDS  
TEE NUTS  
COUPLING NUTS  
ADJUSTABLE STEP BLOCKS  
STAR TYPE HAND KNOBS  
HEXAGON TYPE HAND KNOBS  
ANGLED HEAD SCREWS

T-NUT & STUD SETS  
STEP BLOCK SETS  
PUNCH PRESS SETS

*Northwestern*  
119 HOLLIER AVE., DAYTON 3, OHIO

**CLEVELAND**  
*lead screw*  
**tapping machines**

Increase your efficiency by combining  
these operations



- Tapping
- Threading
- Drilling
- Spot-facing
- Reaming
- Chamfering

Write for Catalog 283-W-2

**THE CLEVELAND TAPPING MACHINE CO.**  
A Subsidiary of Automatic Steel Products, Inc.  
CANTON 6, OHIO.

## DeMott Succeeds Batt as President of SKF

Richard H. DeMott, who started as a salesman with SKF Industries, Inc., Philadelphia, 35 years ago, is the new president of the ball and roller bearing company. He succeeds William L. Batt, wartime production expert, who formally resigned to re-enter government service as chief of the Economic Cooperation Administration mission to the United Kingdom.

Mr. DeMott, who has been vice president in charge of sales since 1943, was graduated from the Stevens Institute of Technology in 1908 and held several jobs before joining SKF in 1915. A year later, he was made district manager of the company's New York sales office. From 1923 to 1928 he served as assistant sales manager and from 1928 to 1942 as general sales manager. During World War II, Mr.

**ATLANTIC**  
\* GEARS \*



SPUR-SPIRAL-WORM-BEVEL GEARS  
GENERATED WITH PRECISION ON  
MODERN EQUIPMENT-SEND SAMPLES  
OR BLUEPRINTS FOR QUOTATION!

**ATLANTIC GEAR WORKS, INC.**  
198-A LAFAYETTE ST. N.Y. 12, N.Y.

**CA 6-1440**



Famous for  
THE TIME /  
THEY SAVE!



Made in a complete range  
of small sizes from 1 1/8" x  
2 1/2" to 2 1/4" x 3" working sur-  
face. Floating Wedge Lock  
is positive and locks in any  
position of rack-movement.

Write for catalog.

ESCO ENGR. CO.,  
13413 Euclid Avenue,  
Cleveland 12, Ohio

## CAMS

A complete cam cutting service for  
both large and small cams is offered  
by our **ROWBOTTOM** and **DALY** cam  
milling facilities.

May we quote **YOU?**

**BLAIR TOOL AND MACHINE CORP.**  
119-03 15th Ave. College Point, L. I., N. Y.

## WESTLEN *Adjustable Self Centering* REELS

*Self*



For feeding strip and wire  
coil stock to presses. Coil  
capacity 300 to 500  
lbs. Outside ring  
dia., 28" to 36".  
Height of reel, 36".  
Wheel automatically  
adjusts parts to suit  
inside diameter of  
coils from 11" to 20".  
Arm allows for quick  
conversion to hori-  
zontal or vertical po-  
sition and adjusts  
height of reel.

Write for prices and  
literature.

**The RULETA Co.**  
27 WARREN ST. NEW YORK 7.

YOU'VE GOT TO BE SURE OF YOUR HARDNESS  
... INSIST ON **CLARK** TEST BLOCKS



Price Each: \$1.50, F.O.B. Detroit

**CLARK**  
**INSTRUMENT, INC.**

10200 Ford Road Dearborn, Mich.



Your hardness tester is useful  
only when you are sure it is  
giving you accurate, depend-  
able readings. You can rely on the  
accuracy of your hardness tester when  
you check it regularly with **CLARK**  
standard test blocks. Clark test blocks,  
in various hardness grades, provide a  
quick, sure, and simple method of  
assuring accurate hardness tester  
readings.

DeMott was in charge of all negotiations for the building of a government-owned plant at North Wales, Pennsylvania, for the manufacture of aircraft bearings.

### Heating and Ventilating Exposition

A wide variety of new products will be displayed at the Tenth International Heating and Ventilating Exposition

in the Commercial Museum, Philadelphia, January 22 to January 26, 1951, reflecting the complications involved in standardizing the weather indoors. The exposition, also known as the Air Conditioning Exposition, is being held under the auspices of the American Society of Heating and Ventilating Engineers, and many of the displays are collateral with the program of the society's 57th annual meeting, which will be held during the same period.

Like its predecessors, the exposition has been organized principally for the purpose of developing the heating, ventilating, and air conditioning arts and practices through providing a meeting ground where architects, engineers, designers, building owners, and manufacturers and the contractors who perform the work of installation and service may gather to their mutual advantage. As many of the displays are technical, the general public is not invited. Only qualified visitors will be permitted to register.

The advertisement features a large, stylized speech bubble containing the text "AUTOMATIC FEEDING CAN'T MISS, CAN'T FORGET!" in bold, sans-serif letters. Below the speech bubble is a black and white photograph of a Benchmaster Friction Roll Feed machine. The machine consists of a large flywheel at the top, connected by a belt to a smaller wheel, with various mechanical components and a base. To the left of the machine, a small rectangular box contains the text "Write for FREE circulars." To the right of the machine, there is a large headline "1/3 THE COST" followed by several descriptive lines: "you'd expect to pay! Step-up production, increase operator safety, with the new BENCHMASTER FRICTION ROLL FEED". Below this, it says "5 sizes—from 1 1/2" to 9" widths. Adaptable for all presses." At the bottom, the brand name "benchmaster" is written in a large, bold, lowercase font, followed by "PUNCH PRESSES AND MILLERS" in a smaller, uppercase font. The address "2952 West Pico Boulevard, Los Angeles 6, California" is printed at the very bottom.

Model  
PE-1



2 & 3  
dimensional  
models

**Variable Ratio Pantographs,  
Pantograph Controlled,  
Profiling Vertical Millers.**

For Contour Milling, Profiling, Intricate Cams, Calibrating, Die and Mold making. Engraves on curved surfaces without special templates, with smooth lines in any design, number, letter; on iron, brass, copper, aluminum, soft steels and all plastics • Drills a series of holes • Increases accuracy and production • Etches glass and similar items • For information and prices write Dept. M.

**AUTO ENGRAVER CO.**  
Florida Hill Rd.,  
Ridgefield, Conn.

DESPITE GENERALLY  
RISING PRICES—

increased  
PRODUCTION FACILITIES  
permit us to

**CUT PRICES**  
from **12 to 15%**

on our complete line of

**MARVECO  
LIVE CENTERS**

New prices retroactive to Oct. 15, 1950

**MARVEL TOOL & MACHINE CO.**  
1096 North River Road, St. Clair, Mich.

Nicholson W.O. Traps

**STOP COSTLY AIR  
LOSS** these 3 ways

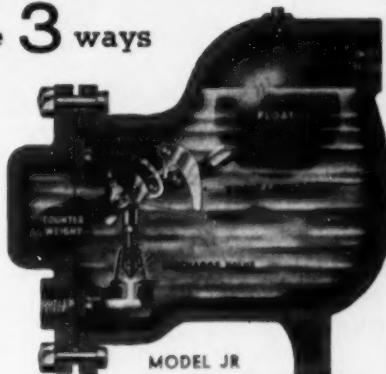
With air the most expensive pressure medium today, these 3 leak-proofing features of Nicholson air traps are proving important cost-cutters:

- 1) No air-wasting vent, such as is in all inverted bucket traps.
- 2) Positive water-seal at valve.
- 3) Large orifice keeps valve clean, preventing blow-through.

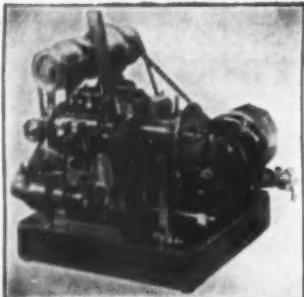
Three types; pressures to 1500 lbs.  
**CATALOG 250.**

**W. H. NICHOLSON & CO.**  
136 OREGON ST., WILKES-BARRE, PA.

Steam & Air Traps - Control Valves - Expanding Mandrels - Arbor Presses - Welded Floats



MODEL JR.



## WALTHAM

### Pinion and Gear Cutting Machines

with revolving cutter will make 1, 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to 1 $\frac{1}{2}$ " dia. Blanks are held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut.

### WALTHAM MACHINE WORKS WALTHAM, MASS.

Pinion and Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery.



## SCHAUER SPEED LATHES

FILE  
LAP  
POLISH  
BURR  
GRIND

SMALL PARTS  
*faster,  
at less cost!*

Write for Bulletin 500

SCHAUER MANUFACTURING CORP.

\* ORIGINATORS OF TODAY'S SPEED LATHES  
2060 Reading Road Cincinnati 2, Ohio

### Morse Chain Elects Officers

The re-election of F. M. Hawley as president and general manager and the appointment of six new officers has been announced following a meeting of the board of directors of Morse Chain Company, a division of Borg-Warner Corporation. J. N. Candler, formerly administrative assistant to Mr. Hawley, has been appointed vice president and assistant general manager. R. J. Howison, formerly general sales manager, now becomes vice president in charge of sales. E. W. Deck, formerly manager of the Ithaca plant, has been named vice president in charge of manufacturing at the Ithaca plant. M. V. Durkin, former manager of the company's Detroit plant, has been appointed vice president in charge of manufacturing at the Detroit plant. W. M. Reynolds has been named secretary and treasurer and E. G. Wuensch has been appointed assistant treasurer. V. P. Burgess has been reappointed assistant secretary.

### Hughes Appointed Utica Vice President

The appointment of Thomas R. Hughes as vice president and sales manager has been announced by Utica Drop Forge and Tool Corporation. A native of Philadelphia, Mr. Hughes came with Utica Drop Forge in 1940 as a production control man and progressed through the manufacturing side of the business to superintendent of the shop. From here he was moved into sales for which he was eminently fitted, not only by disposition but because of his intimate knowledge of every phase of Utica's manufacturing. During the past year, as sales manager, Mr. Hughes has traveled from

## FINISHED

### MACHINE KEYS



We are able to furnish the following types of finished machine keys of any size and taper: Gib head taper keys, Plain taper keys, Straight keys, Round end feather keys and Tit keys. We can supply you quickly with the quantities you need at the specifications you require.

Send for new catalog giving complete information on Woodruff keys, taper pins, machine keys and machine racks.

### STANDARD STEEL SPECIALTY COMPANY

BEAVER FALLS  
PLANTS: BEAVER FALLS, PA. • HAMMOND, IND.

PENNSYLVANIA



TYPE HOLDERS AND TYPE ROLL MARKERS  
HAND STAMPS LOGOTYPES DIES STANDARD  
AND SPECIAL STAMPS INSPECTORS' STAMPS  
MACHINE ENGRAVING PRECISION DUPLICATING

**NEW METHOD STEEL STAMPS, Inc.**  
149 Joseph Campau, Detroit 7, U.S.A.

## People work better when they SEE BETTER

### MAGNI-FOCUSER SPEEDS PRODUCTION



MAGNI-FOCUSER's matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses.

Precision workers do the job faster and more accurately with a Magni-Focuser — the proven binocular magnifier.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Leaves both hands free. Normal vision may be resumed by lifting head.

Now aiding thousands of workers, the Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

*Send for descriptive folder*

### EDROY PRODUCTS CO.

480 Lexington Ave.,  
Dept. P, New York 17, N.Y.



Cutting tapping costs is one way to attack general production costs. And the path to lower tapping costs lies in checking each of the following factors:

1. Is the tap carefully engineered to its specific job?
2. Is it made to exacting specifications by experienced craftsmen?
3. Is the machine right for the job—spindle, alignment, speed, lubrication? Only the right combination of all of these will give you the most perfect threads per tap which means the lowest cost. Tool engineers and production men who know tapping have, for years, looked to Wood & Spencer for the first two factors. They know that Wood & Spencer engineering and craftsmanship give them the tap that starts them on their way toward true tapping economy. Perhaps we can help you save dollars on tapping costs. Write us today.

#### THE RIGHT TAP AT THE RIGHT TIME

*The Wood & Spencer Company*  
Cleveland 3, Ohio

coast to coast, visiting and working with Utica representatives, jobbers, and other customers.

#### Bullard Offers M.A.P.I. Replacement Manual

The Bullard Co., Bridgeport 2, Conn., is now offering the M.A.P.I. Replacement Manual. This 75-page cloth-bound manual is a comprehensive handbook designed for all persons having practical questions of re-equipment and who are responsible for the continuing progress of a manufacturing enterprise. The book represents a practical guide to the procedures and principles developed in the Machinery & Allied Products Institute's extended volume "Dynamic Equipment Policy." It is self-contained except for reference to the extended volume as background and authority. Like the longer work, the manual is predicated upon the lesson which American industry must learn from technological stagnation present in the industrial countries of Europe.

The manual is specially arranged for convenient use. The first three chapters are directed to the policy-making executive. Chapter I tells him what is wrong with present replacement practices, Chapter II presents an introduction to the M.A.P.I. formula and procedure, and Chapter III deals with the proper organization of equipment policy. The three final chapters include a group of interesting applications of the formula, as well as a simplified chart solution.

Copies of the M.A.P.I. Replacement Manual can be obtained by qualified executives who write to The Bullard Company on their company letterheads.

## Immediate Delivery FROM STOCK

### GREAVES-SILENT BAKELITE GEARS



No waiting when you order Greaves Silent Bakelite Gears. • We have them in stock NOW! • Your order will go forward immediately. • You'll appreciate the silent operation and added smoothness provided by Greaves Silent Bakelite Gears. • You'll marvel at their great strength to carry big power loads . . . their remarkable ability to successfully operate completely submerged in water. • You'll welcome their low cost. • No metal reinforcements required. • Save Time . . . Money . . . Labor!

We also make silent gears of rawhide and Fabriol.

Write for Circular.



FOR CONCERNING  
EXTRAORDINARY  
GEARS WE CAN  
MAKE IMMEDIATE  
DELIVERY OR  
BLANKS SAWED TO  
SPECIFIED  
DIAMETER AND FACE



MACHINE TOOL COMPANY

DIVISION OF J. A. FAY & EGAN CO.

2015 Eastern Avenue  
Cincinnati 2, Ohio

### GREAVES No. 2-H MILLING MACHINE PLAIN OR UNIVERSAL



SEND FOR  
BULLETIN  
AND  
PRICE  
LISTS

Simple in design. Easy to operate. Rigid construction including every worthwhile modern feature of milling machine development. With 18 spindle speeds (20 to 1000 R.P.M.) both the universal and plain millers are readily adaptable for heavy duty or light precision production work. Send for bulletin



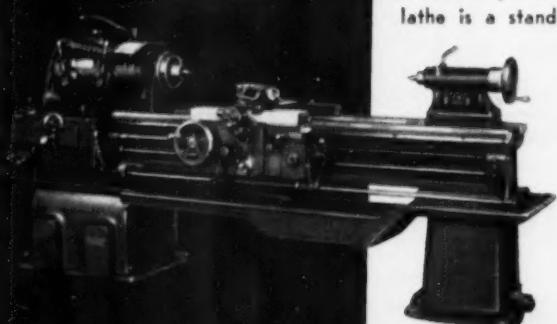
MACHINE TOOL COMPANY

DIVISION OF J. A. FAY & EGAN CO.

2015 Eastern Avenue  
Cincinnati 2, Ohio

## BOYÉ & EMMES in Cincinnati

SINCE 1895



FOR 55 YEARS BUILDERS OF TOP  
QUALITY MACHINE TOOLS

• This Boyé & Emmes heavy duty 16-inch lathe is a standout in production performance. Higher speeds and a greater number of thread, lead and feed changes are now obtainable. When buying an engine lathe, check the Boyé & Emmes dependable line and learn about the advantages this lathe offers. Complete catalog available on request.

## THE BOYÉ & EMMES MACHINE TOOL CO.

Heavy Duty Lathes — Sizes 14" through 32"

125 CALDWELL DRIVE

CINCINNATI 15, OHIO

## Hack Saw Manufacturers Association Adopts Stock Numbers Code

The Hack Saw Manufacturers Association of America announces that the hack saw blade industry has adopted a standard stock numbers code for power sizes of hack saw blades. Prior to adoption by the manufacturers, this code was submitted to the National Supply and Machinery

Distributors' Association and Southern Supply and Machinery Distributors' Association and has been endorsed by these associations.

The industry standard stock numbers code will be included in printed matter or otherwise used by an individual hack saw blade manufacturer as and when desired by him. However, the new code does not conflict with any previously used code and will be understood by all manufacturers of hack saw blades. Therefore, the new code can be used immediately by any distributor or user of hack saw blades.

## REID SURFACE GRINDERS

★  
THE PRECISION  
CHOICE OF WORLD-  
WIDE INDUSTRY

★  
1900 50th 1950  
*Anniversary*

REID BROTHERS CO., INC.  
BEVERLY • MASSACHUSETTS

## Houston Instrument Convention Committee Organizes

At a recent meeting of the Houston Section Committee of the Instrument Society of America plans were discussed for the Sixth National Instrument Conference and Exhibit to be held in the San Houston Coliseum September 10-14, 1951.

Referring to the accompanying illustration, the following men were present at the meeting: (Seated, left to right) Dale Mattix, Cities Service Corp., Lake Charles, La.; C. R. Miller, General Tire & Rubber Co., Baytown, Tex.; M. J. O'Neal, Shell Oil Co., Houston, Tex. (president, Gulf Coast Spec-



## TOOLMAKERS' SPECIAL

Magnetic Parallels at a popular price. Do a better job quicker and make your time more valuable.

**Universal Transfer Punch, Inc.**

DEPT. M, BOX 412

• MASSILLON, OHIO

• • • • CARROLL • • • •  
DIVIDING HEADS



**3 SIZES — 4 MODELS — 6" to 12"**

## TROYKE MFG. CO.

4422 APPLETON ST., CINCINNATI 9, OHIO

**CAMS**

Our **ROWBOTTOM** cam cutting facilities are at your disposal for your cam requirements.

We Solicit Your Inquiries.

**BLOOMFIELD TOOL CORP.**

37 FARRELL ST.

BLOOMFIELD, N. J.

**"OLIVER"** Metal Cutting  
38-inch  
**BAND SAW**

**Has low speed geared head direct connected to lower wheel for cutting light and heavy sections of metal.**

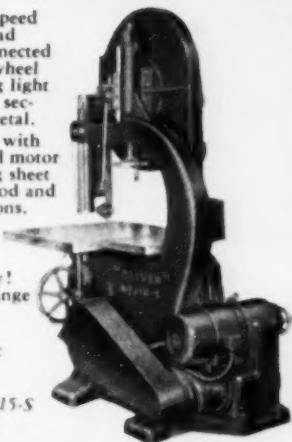
**Furnished with high-speed motor for sawing sheet metal, wood, etc.**

Cuts true  
and steady!  
Quick-change  
rim and  
tire.

#### **Automatic brakes.**

**Bulletin 115-S**  
**Write for**

OLIVER MACHINERY CO., Grand Rapids 2, Mich.



BARKER

**(Two-Jaw or Three-Jaw)**

## **WRENCHLESS CHUCK**



from 18 to 24 pieces per hour. It can do it in *your* plant too. Let us show you how!

*Write for bulletin 201 today*



*— Chuck Division*  
**THOMAS HOIST CO.**

28 S. HOYNE

**CHICAGO 12**



Personnel attending recent meeting of Houston Instrument Convention Committee

troscopic Group); C. W. Bates, Humble Oil & Refining Co., Baytown, Tex.; Prof. G. L. Farrar, Department of Chemical Engineering, A & M College of Texas (chairman of Steering Committee for Symposium on Instrumentation for Process Industries); M.

K. Anderson, Carbide & Carbon Chemical Co., Texas City, Tex.; W. H. Fortney, Humble Oil & Refining Co., Baytown, Tex. (chairman, Houston I.S.A. 1951 Convention Committee); Paul H. Buehner, convention manager, Houston Chamber of Commerce; (stand-

### STOP SCAVENGING

- Quickly switch from large to small workpieces without time wasting, tedious hunting of scrap shims. How? Easy with these drop forged, serrated clamps. Holds work up to 6" high.
- Set contains crosspieces (2 plain, 2 goose-necks) and uprights (2 each of 2", 3", 4" and 6"). Crosspieces take up to  $\frac{1}{2}$ " T-Bolts. \$17.50.
- FOR 10 DAY FREE TRIAL MAIL AD TO:

**MONTGOMERY & CO., Inc.**  
Since 1876  
49 Park Place, N.Y.C. 7

### ALL-ANGLE PLATES

Quickly set up for any angle between 0° and 90°. Made of normalized grey iron. Adjusting mechanisms are hardened and ground. Catalog on request.

a. 3" x 3"	(w/T-slots)	\$35
b. 6" x 6"	(w/tapped holes)	\$75
c. 3 1/2" x 4"	(Sine plate)	\$125
d. 9" x 12"	(worm drive, compound angle)	\$250

- FOR 10 DAY FREE TRIAL MAIL AD TO:

**MONTGOMERY & CO., Inc.**  
Since 1876  
49 Park Place, N.Y.C. 7

### ONE-OF-A-KIND SPRINGS

NO  
LATHE  
NECESSARY



1. 60 second action for a spring 12" long.
2. Ideal for tool room, research lab. and repair shops.
3. Mandrel capacity to 1½".
4. Wire capacity up to .229" diameter.
5. Pitch capacity up to 1".
6. Clamps in your bench vise.

**Price \$44**  
Other small shop sizes from \$19  
For 10-Day FREE TRIAL, tear ad out and mail to:

**MONTGOMERY & CO., Inc.**

Since 1876

49 Park Place, N.Y. 7, N.Y.

### SAFETY RADIUS DRESSER



- Key tool men are safe from sparks and flying grit because this dresser works beneath the wheel, and the wheel guard can always be left in place.
- Capacity: concave, 2½"; convex, 1½". Maximum wheel size 8". • Overall dimensions: 6" x 6" x 3" wide. Weight 16 lbs. • Price with diamond \$85.00. Catalog on request.
- FOR 10 DAY FREE TRIAL MAIL AD TO:

**MONTGOMERY & CO., Inc.**

Since 1876

49 Park Place, N.Y.C. 7

USE  
**ACME**  
RED OR BLUE LABEL  
PRECISION  
**DOWEL**  
**PINS**

WRITE  
FOR  
CIRCULAR



**SAFEGUARD**  
EXPENSIVE DIES AND  
MACHINE PARTS

Acme Dowel Pins break before bending or mushrooming—thus saving expensive equipment from ruin through misalignment. Order standard sizes from stock. Attractive prices on special sizes and large quantities.

**A**cme **I**ndustrial **C**ompany  
Makers of Standardized Jig & Fixture Bushings  
212 N. Laflin Street • Chicago 7, Illinois

THE SERVICE SHOP TO INDUSTRY FOR MORE THAN 25 YEARS

ing) W. B. Rawson, vice president, Maintenance Engineering Corp., Houston, Tex.; A. Costa, Westcott & Greis, Houston, Tex.; R. E. Hanson, Leeds & Northrup Co., Houston, Tex.; E. E. Kleir, Foxboro Co., Houston, Tex.; R. L. Nichols, Magnolia Petroleum Co., Beaumont, Tex.; C. L. Garner, Garner Instrument Co., San Antonio, Tex.; L. C. Books, Shell Oil Co., Houston, Tex.; I. K. Farley, Brown Instrument Div., Houston, Tex.; Richard Rimbach, executive secretary, I.S.A., Pittsburgh, Pennsylvania.

### Two New Concerns Added to I.S.E.A. Membership

At a meeting of the Industrial Safety Equipment Association held recently at the University Club, Chi-

cago, two new concerns were added to the association membership. These are the Glendale Optical Co., Inc., Brooklyn, N. Y., and the Fendall Company, Chicago.

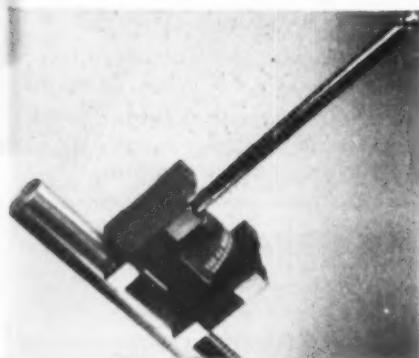
A board of trustees consisting of seven members was established for the first time. The board consists of association president C. H. Gallaway, American Optical Co., Southbridge, Mass.; vice president, E. L. Wheeler, Wheeler Protective Apparel, Inc., Chicago; past president L. E. Dickson, Standard Safety Equipment Co., Chicago; E. H. Brooks, Safety Clothing & Equipment Co., Cleveland; F. R. Davis, Jr., Davis Emergency Equipment Co., Inc., Newark; S. C. Herbine, Willson Products, Inc., Reading, Pa.; G. P. St. Clair, Medical Supply Co., Rockford, Illinois.

## Additional Data on "Holding Work Magnetically"

THE magnetic base shown in the accompanying illustration may be added to the various types of magnetic holding devices which were illustrated and described in the October and November issues. The base is designed for the convenient application

of dial indicator gages as well as for the holding of work in position on surface plates, the supplying of magnetic power to rods for the removal of chips from drilled or tapped holes, the holding of coolant pipe nozzles on machine tools, and for various other jobs.

An outstanding feature of the base is its applicability to round as well as flat surfaces. This particular feature is effected by relocating the magnet barrel to allow for V-slots on one side. Designed to facilitate positioning of a gage at the point for quick and easy reading, this base has a 40 to 50-lb. grip on all four sides.



View of a magnetic base holder designed for use on round as well as flat surfaces. Illustration courtesy The duMont Corporation.

## ARTUS PLASTIC SHIM



AND  
FEELER  
GAUGE  
STOCK

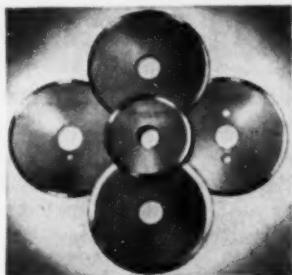
The COLOR  
tells the  
THICKNESS

Each thickness a distinctive, easy to identify color. Impervious to oil. Long lasting. 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together. \$4.25.

Order today. Immediate delivery.

**INDUSTRIAL PRODUCTS SUPPLIERS**  
434 Broadway, Dept. M, New York 13, N.Y.

F  
A  
S  
T  
E  
R



## PIPE and TUBE CUTTING

... More Cuts per Wheel

Continental Steel Cut-Off Wheels, available for all make, of rotary cut-off machines, provide increased production . . . at modest cost.

Discs 7" dia.,  $\frac{3}{8}$ " and  $\frac{1}{2}$ " thick carried in stock. Bore 1 $\frac{1}{8}$ ", 1 $\frac{1}{2}$ ", or 1 $\frac{3}{8}$ ". Special sizes made quickly.

Write for folder and prices.

**CONTINENTAL MACHINE CO.**  
1952 MAUD AVE. CHICAGO 14, ILL.

For HAND TAPPING OR  
LATHE USE . . .

**TAP BREAKAGE**  
Reduced

The Dahlstrom Tap Guide practically eliminates tap breakage and saves wasted hours by getting broken taps out of expensive dies. It does the job in a jiffy with work always straight and true. Carry it over to your big work, or fasten it to a post, slip a Tap Adaptor into the spindle, and even an inexperienced operator can handle it. Equipped with 9 Adaptors, ranging from 8-32 to  $\frac{3}{4}$ ".

Write for circular.

**DAHLSTROM MANUFACTURING CO.**  
2522 W. LARPENTEUR AVE. • ST. PAUL 8, MINNESOTA



Spindle has center in top end to go in tail stock of lathe. Or use it as tap extension for hard-to-get-at-places

Also Makers of  
Dahlstrom Autostop  
and Tap Chuck

**Dahlstrom TAP GUIDE**

### Did You Know That...

Gardner S. Gould, Sr., has announced the formation of the **Gould Engr. & Sales Co., Inc.**, 17 Moore St., Leominster, Mass. The company will design and have built special production machine tools, principally grinding machinery, jigs and fixtures, and so on, and will also sell and service production equipment.

**William F. Munday**, deputy controller of The International Nickel Company of Canada, Limited, died recently at the age of 54. Mr. Munday joined International Nickel in April 1918.

— o —

**Raymond T. Porter** has been appointed eastern sales manager of the Heppenstall Co., Pittsburgh, Pa., and is now in general supervision of die blocks, shear knife, tongs, rings, and other forging sales throughout the company's Boston, Bridgeport, New York, and Philadelphia sales districts.

— o —

## A FRESH TO AN OLD APPROACH PROBLEM

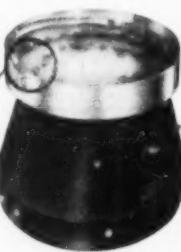
### SYNTRON

"Vibratory"

## SMALL PARTS FEEDERS

### Provide Automatic, Oriented Position, Single Line Feeding

Feed various types of small parts—washers, shims, lamp bulbs and bases, buttons, etc.—to inspection and counting devices, packaging machines and other automatic processing equipment.



3600 vibrations per minute move parts up spiral track where "selectors" orient them for discharge.



Send us details of your problem—and sample parts for testing. We'll be glad to submit recommendations and quote prices.

**SYNTRON CO.**

309 Lexington Ave.

Homer City, Pa.

**Paul E. Crafton** has been appointed Chattanooga district sales engineer for F. J. Evans Engr. Co., Birmingham, Ala. Mr. Crafton, who will be located at 3808 Mission View Ave., Chattanooga, Tenn., will specialize in the sale of Surface Combustion Corporation heat-treating furnaces and burners and Webster Engineering Company industrial burners equipment.

**GRANT**

## RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to  $\frac{3}{8}$ " diameter, either by noiseless spinning or vibrating hammer method.— Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**  
96 Silliman Ave. Bridgeport 5, Conn.

## MILWAUKEE

### DIE FILERS PROFILE GRINDERS

#### Cut Production Costs!

##### DIE FILER

Model FS with new All-Purpose, Deep-Throated Overarm performs all tool and die-making operations efficiently, at low cost.



##### PROFILE GRINDER

Available in two models—STANDARD and HIGH SPEED . . . for mounted stone wheels and diamond or carbide wheels respectively.

## RICE PUMP & MACHINE CO.

1041 S. 40TH STREET  
MILWAUKEE 4, WISCONSIN

# MULTIPLE DRILLING with a...



**MULTI-DRILL**  
Increases Capacity Up to 800%  
ADJUSTABLE TO ANY HOLE PATTERN  
. . . FITS ANY DRILL PRESS

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern—is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as  $\frac{1}{8}$ "—handle drill sizes up to  $\frac{3}{8}$ " in steel. Special adaptations available.

*There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.*

**COMMANDER MFG. CO.**  
4224 WEST KINZIE ST. CHICAGO 24, ILL.

**Product of Commander — Builder of the Commander Tapper**

## Did You Know That--

The Allison Co., Bridgeport, Conn., manufacturer of abrasive cutting wheels, has announced the appointment of **Grant J. Casserly** and **David R. Falvey** as field engineers for the recently combined territories of New England and northeastern New York State. Headquarters for both men will be the company's home office.

**James J. Murray**, owner of Murray Equipment Co., 11820 Brush St., Detroit, Mich., has signed a distributorship agreement to handle Worthington Pump and Machinery Corporation Multi-V drives and fractional horsepower belts and sheaves.

— o —

**I. L. Wallace**, formerly superintendent of the carbide metal division of Carboly Company, Incorporated, has been named manager of engineering on both carbide and other special metals.

**J. A. Muldoon**, formerly superintendent of the carbide fabricating division, has been advanced to manager of manufacturing for carbides and other special metals.

**R. L. Brownlee**, formerly production manager on carbides, will also act in the same capacity for other special metals.

**F. C. Ritner**, in addition to his responsibilities as vice president in charge of research, will also assist **E. F. Wambold**, executive vice president, in a general administrative capacity.

## the "POCKET SIZE MACHINE SHOP"

### DREMEL MODEL 2 MOTO-TOOL KIT



Moto-Tool Kit No. 2 contains 23 accessories, including high speed steel cutters and Model 2 Moto-Tool in natural finish hardwood case \$23.50

Moto-Tool No. 2, with one emery point \$16.50

• Ford, Remington Arms, Westinghouse, Nash-Kelvinator, Douglas Aircraft and many other plants use Dremel Moto-Tools to speed up hand operations with resultant savings in labor, time and material. Moto-Tool has oil-sealed bearings for long life, dynamically balanced armature for vibrationless operation . . . delivers 27,000 r.p.m., yet weighs only 13 oz.

DREMEL MFG. CO. • DEPT. 220-M • RACINE, WIS.



IF YOUR MILL SUPPLY DEALER CANNOT SUPPLY YOU, WRITE THE FACTORY

**REID**

*One Source for...*



Threaded Plastic Balls  
Oval or Round

Clamping  
Handles



Cast Iron Hand Knobs, Three Styles

Machine Handles

Straight, Crank and Offset



Hand Wheels  
Straight or Dished

ALSO SCREW CLAMPS, MACHINE VISES, FIXTURE UNITS, MAGNETIC BLOCKS AND ROTARY TABLES.

Write for Catalog and Prices on Complete Reid Line

**REID TOOL SUPPLY CO.**

709 BAKER ST.

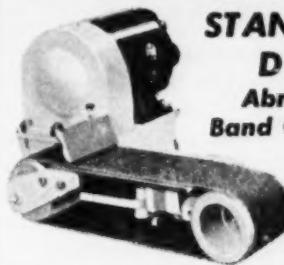
MUSKEGON HTS., MICH.

**STANDARD**

**D - 4**

Abrasive  
Band Grinder

Famous  
for  
Stamina



This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36 $\frac{1}{4}$ " band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW  
MANUAL ON FINISHING—WRITE TODAY

**WALLS SALES CORP.**

333 Nassau Avenue, Brooklyn 22, N.Y.

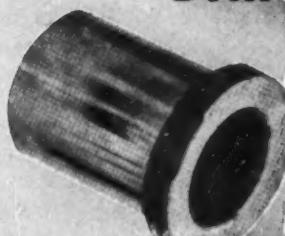


You're a Production Winner

with

**Economy**

**Drill-Jig Bushings and Gages**



Yes, they're in stock, ready to go out to you — all A. S. A. standard types and sizes. You can also get fast service on new gages or gages salvaged by hard chromium plating . . . precision-finished, durable. Write for bulletin and price list.

**Economy** TOOL & MACHINE CO.

1827 SOUTH 68th STREET • MILWAUKEE 14, WISCONSIN

## Did You Know That---

The Cleveland Automatic Machine Company has announced the appointment of **Herbert W. Roushkolb** as district manager of the company's Detroit office. Sales and service for automatics and high pressure hydraulic die casting machines in the Detroit area will be handled through this office, located at 540 New Center Bldg., Detroit 2, Michigan.

New Cleveland Tramrail representatives have been appointed in New York City, Atlanta, Georgia, and Los Angeles, California. The New York representative will be the **Cleveland Tramrail Division of Material Handling Equipment**, 30 Church St., New York 7, N. Y. The Atlanta representative is the **Cleveland Tramrail Division of John W. & Wm. H. Carlson**, 23 North Ave., N. W., Atlanta 3, Ga. The Los Angeles representative is **Cleveland Tramrail California Co.**, 4700 District Blvd., Los Angeles 58, California.

— o —

H. F. Hodkins, president of Lipe-Rollway Corp., Syracuse, N. Y., has announced the appointment of **A. Alven** as general sales manager in charge of all sales, including machine tool, bar feed, hacksaw, and clutch sales. Mr. Alven has been general sales manager of Rollway Bearing Co., Inc., Syracuse, N. Y., a subsidiary of Lipe - Rollway Corporation, for the past year and a half and will continue in this capacity along with his new duties.



### Short Solenoid Strokes Permit High Operating Speeds with Full Volume Operation

RUGGED  
CONSTRUCTION  
FOR HEAVY DUTY  
OPERATION

•  
CYCLING TO  
600 PER MIN.

•  
FOR CONTROL OF  
COMPRESSED AIR  
PRESSURES  
20 TO 150 LBS.

Available in standard pipe sizes.

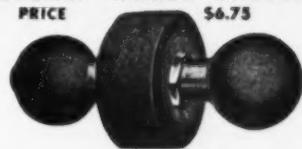
Thousands of AUTOMATIC 3-way and 4-way valves in daily operation. Write for bulletin and prices. Attractive quantity and O.E.M. discounts.

**AUTOMATIC VALVE CO.**  
**37419 GRAND RIVER AVE., FARMINGTON, MICH.**

**PIONEERS and SPECIALISTS in PILOT  
OPERATED SOLENOID CONTROLLED VALVES**

## METCALF WHEEL DRESSERS

**PRICE** \$4.75



**PRODUCE  
SHARP—CLEAN—  
WHEEL FACES**

Fast, efficient cutting action of grinding wheels is assured because of these Metcalf principles:

**HIGH SPEED GYROSCOPIC ACTION  
EXTRA LARGE, HEAVY, BALL-TYPE  
HANDLES FOR BALANCE  
FAST CRUSHING AND FORMING BE-  
CAUSE OF ABRASIVE TRUING WHEEL**

**HANCHETT MANUFACTURING CO.**  
*Manufacturers of Saw and Knife Machinery*  
Dept. MM-120      BIG RAPIDS, MICHIGAN

*...just right for size*

# **CHAMPION**

expanding  
mandrel



**assure • dependable • economical**

Simply move the flexible sleeve on the taper arbor and get thousands of variations for holes from  $\frac{1}{2}$ " to  $6\frac{1}{2}$ ". Sizes are 1 to 12 with large and small sleeves for sizes 6 to 12. Write for data sheet today. Dept. M.M.

The WESTERN Tool & Mfg. Co., Springfield, Ohio

**CHICAGO "SAFETY PLUS" SOCKET SCREWS MAKE  
YOUR PRODUCT BETTER 4 WAYS**

- **THEY'RE STRONGER**—They fasten products **MORE** securely—give a sturdier, tighter "hold".
  - **THEY GO FARTHER**—Because they're stronger, they fasten tighter with fewer screws, give neater appearance with less weight.
  - **MORE ACCURATE**—They're consistently more accurate in dimensions, have sharper, smoother, true threads, start in easier the first time.
  - **THEY COST LESS**—Tighter hold, plus fewer screws, plus a faster fit, means **LOWER COSTS**—in screws as well as production time.

There is a Chicago "Safety Plus" Product designed to give you a tighter, lower cost fastening for ANY heavy duty application.

FIND THE TYPE YOU NEED  
FROM THIS LIST.

**Socket Head Cap Screws** • **Socket Set Screws** • **Stripper Bolts** • **Square Head Dog Point Set Screws** • **Socket Pipe Plugs** • **Keys** • **Hexagon Head Cap Screws**, Steel and Brass • **Square Head and Headless Cup Point Set Screws** • **Fillister and Flat Head Cap Screws** • **Taper Pins** • **Milled Studs** • **Semi-Finished Hexagon Nuts**, Steel and Brass • **Hexagon Castellated Nuts**.

Service-conscious Industrial Supply Distributors **EVERWHERE** carry complete stocks of Chicago "Safety Plus" Products. To speed delivery time, call the one nearest you.

*The* CHICAGO SCREW COMPANY

2505 WASHINGTON BLVD., BELLWOOD, ILL. • Established 1872

### Did You Know That--

**Ralph S. Euler**, senior vice president of Mellon National Bank and Trust Company, has been elected to the board of directors of Allegheny Ludlum Steel Corp., Pittsburgh, Pennsylvania.

— o —

**Ohio Equipment Company** has completed its move into larger, modern quarters at 1220 W. 9th St., Cleve-

land 13, Ohio. The firm will continue to represent Economy Engineering Company for the full line of portable elevators, tiering machines, and storage racks.

— o —

**Carlton R. Becker** has been appointed western factory representative for Morse Chain Co., Detroit, Mich., and will supervise the sales of mechanical power transmission products in the eleven states west of and including Montana, Wyoming, Colorado, and New Mexico. Mr. Becker's headquarters are at 1571 Harding Ave., Pasadena 7, California.

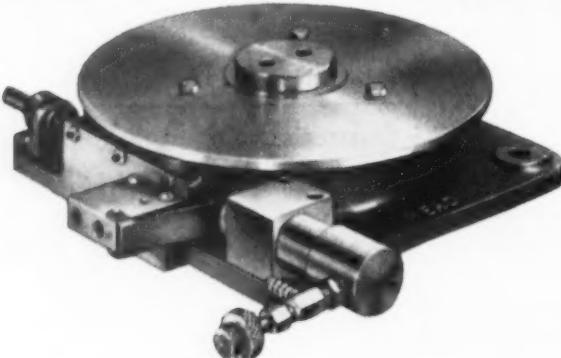
— o —

**H. Sturgis Potter** has been appointed general sales manager by The Carpenter Steel Co., Reading Pa., to succeed R. V. Mann, who until his recent death was vice president in charge of sales.

— o —

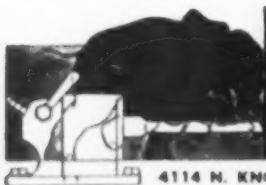
**C. I. Hayes**, Inc., Providence, R. I., has announced the appointment of **Dr. Tracy C. Jarrett** as midwest representative for its line of heat-treating furnaces and allied equipment.

## Air Operated ROTARY WORK FEEDER



Deftly holds and delivers small parts to drill, tap, swage, stake, etc. Stations accurate to .002". Guaranteed against over-travel or "skipping." Indexes as slow or fast as you like, up to 10,000 per hour. Compact and sturdy, easy to tool and hook up.

Standard dial plate 10"; available in 12". For a new job, simply tool up a new dial. Readily combines with "MEAD-MATIC" Timer, Air Hammer, Air Press, Drill Presses, etc.—to make almost completely automatic machine — operator merely loads. Write for full details.



# MEAD

SPECIALTIES COMPANY

4114 N. KNOX AVF. DEPT. AA-120, CHICAGO 41, ILL.

## USE ECONOMY

Headless  
Set  
Screws

Socket  
Set Screws



Try Them On Your Next Job!

ECONOMY  
MACHINE PRODUCTS  
COMPANY

5212 Lawrence Ave., Chicago 30, Ill.

AUTOM



## CONTINUOUS HINGES

Manufactured by

AUTO MOULDING  
& MFG. CO.

WRITE FOR STOCK LIST

1114 E. 87TH ST.

CHICAGO 19

# HAND-FINISHING requires Swiss-Pattern Files



For more than 40 years, "American Swiss" Swiss - Pattern Files have consistently maintained a reputation for uniform hardness, clean sharp teeth, and long wear. For better, faster, filing insist on "American Swiss" . . . 3,000 different sizes and patterns. Buy from our Distributor.

Also manufacturers of American-Pattern files, milled curved tooth files, rotary files, and mechanic's hand tools.

AMERICAN SWISS FILE & TOOL CO.

865 Mt. Prospect Ave. Newark 4, N. J.

★ ★  
*American Swiss*  
SWISS-PATTERN FILES

## Did You Know That--

The Lapeer Manufacturing Company, developer and producer of Knu-Vise toggle-action clamps, has moved its sales offices from W. Grand Boulevard to a new building at 1144 W. Baltimore, Detroit 2, Mich. The manufacturing operations continue at the company's plant located in Lapeer, Michigan.

**Roto-Finish Co.**, Kalamazoo, Mich., is completing the construction of a new addition to its present plant. According to D. T. Barrett, president, the new unit will greatly increase the Roto-Finish processing machine manufacturing facilities.

— O —

The appointment of **Stuart H. Smith** as manager of industrial development and **John H. Tipton** as Cincinnati district manager of S K F Industries, Incorporated, has been announced by R. H. DeMott, president of the ball and roller bearing firm.

— O —



*the Only*  
**\* PANELS • TOOLS  
DIALS • NAMEPLATES**

- Engraves 15 sizes from ONE alphabet
- Covers a LARGER area than any other portable
- Equipped with self-centering holding vise
- Convertible into TRACER GUIDED ELECTRIC ETCHER for identifying tools and dies

SEND FOR CATALOGUE IM27

**new hermes, inc.**  
13-19 UNIVERSITY PLACE • NEW YORK 3 N.Y.  
The world's largest manufacturer of portable engraving machines

Detroit Die Set Corp., Detroit, Mich., manufacturer of precision die sets and die-makers' supplies, has announced the appointment of two distributors in the north central area: **Forcey Machine Tool Sales**, 445 Endicott Bldg., St. Paul 1, Minn., for all of Minnesota and western Wisconsin, and **Wisconsin Tool & Machine Co.**, 6528 W. North Ave., Milwaukee 13, Wis., for eastern Wisconsin.

# Baldor

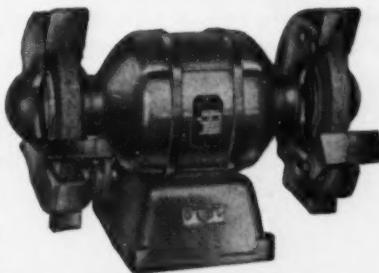
## Precision Grinders

### for tool room or production work

Baldor's No. 8100 shown here is a  $\frac{1}{2}$  HP, 1700 RPM deluxe grinder for sharpening lathe tools, drills, taps, etc., and is also excellent for such production work as grinding off metal burrs, weld seams, etc. Close tolerance work is possible due to vibrationless operation of dynamically balanced armature.

Complete  
as shown \$80.00

Phone your industrial distributor  
now or clip this ad to your letter-  
head and mail for Bulletin 338.



**Baldor Electric Company**

Grinders • Motors • Battery Chargers  
4380 Duncan Ave., St. Louis 10, Mo.

### PRECISION BUILT MACHINIST VISE

Enclosed design prevents chips and dirt from entering internal parts. The balanced motion of a fine threaded spindle, moving freely in an ingeniously anchored sleeve type nut, eliminates dead motion and strain on moving parts. Head moves in precision broached keyway. Complete size range of bench and combination pipe vises. Before you buy, write for our descriptive catalog and give us the name of your preferred distributor.

**WILTON TOOL MFG. CO.**  
925-G Wrightwood Ave. Chicago 14, Ill.

**WILTON**  
THE FINEST NAME IN VISSES



5 Year  
Guarantee



**"C" CLAMPS**

OF PEARLITIC CAST-  
INGS—tensile strength  
up to 80,000 P.S.I.—  
lower in price than  
forged clamps yet  
equally efficient.

### Did You Know That--

**E. C. Barlow** has become affiliated with Charles J. Haas, Incorporated, Philadelphia, manufacturer of industrial chemicals, oils, and greases. Mr. Barlow was formerly with E. F. Houghton and Company for 24 years in the capacity of sales manager for the central division and later was brought into Philadelphia as assistant to the executive vice president.

The Whiton Machine Co., New London, Conn., manufacturer of lathe chucks, centering machines, and gear cutting machines, has appointed the following companies as representatives in their respective areas: **Allen Steel & Supply Co.**, Fort Wayne, Ind.; **Peoria Tool & Engr. Co.**, Peoria, Ill.; **E. L. Essley Machine Co.**, Chicago, Ill.; **Bond Supply Co.**, Kalamazoo, Mich.; **Oatis Mehry. Co.**, Indianapolis, Ind.; **Anderson Machine Tool Co.**, St. Paul, Minn.; **Martin & Prestegard Co.**, Minneapolis, Minn.; **Sterling Products Co.**, Chicago, Ill.; **Cord-Wright Mehry. & Supply Co.**, St. Louis, Missouri.

—O—

For quick, accurate, on-the-spot hardness testing, reading directly in the Rockwell scales.



## Ames PORTABLE HARDNESS TESTER

Flat and round bars, sheets, tubing and wire are tested on the spot without cutting off specimens. Punches, dies, cutters, saws and odd-shaped pieces are tested before and after heat treating. Used by metallurgists, inspectors and heat-treaters. Sizes for work 1" to 6" round and flat. Send for circular.

Comes complete with anvils, penetrators, test blocks and carrying case.

**AMES PRECISION MACHINE WORKS**  
Makers of Precision Bench Lathes & Milling Machines  
**WALTHAM 54, MASSACHUSETTS**

**Herbert J. Werner**, well-known in mechanical and hydraulic press engineering circles for his work in the development of modern metal-drawing press design, has joined the Columbia Machinery and Engineering Corp., Hamilton, Ohio, as chief engineer of the mechanical press division.

# The internal gage that's **RIGHT** for war production conditions **COMTORPLUG**

Gages precision bores to fractions of .0001"

War production conditions intensify the need for a gage that gives high precision yet is Rugged, Automatically Accurate, "Unrestricted".

Patented COMTORPLUG answers the need as no other gage can because:

- 1) Withstands typical shop use at machine or inspection bench, without lessening precision.
- 2) Trainees equal old hands in precision results, due to automatic alignment and "feel".
- 3) For Quality Control, gives actual measurement, and a fixed—not passing—reading.
- 4) Available anywhere instantly. Weighs but a few ounces. No hose, wire, or "10-ton base".
- 5) Cost is so reasonable as to be practical for all quantity gaging applications. Fits in with other gaging methods. Let it grow as it proves itself—which it WILL!

## **COMTOR CO.**

64 Farwell St., Waltham 64, Mass.

Request  
"Bulletin  
40"



For data on COMTORGAGE Precision External Gage, request Bulletin 30.



PATENTED  
EXPANDING  
INTERNAL  
COMPARATOR

1/8" to 8" dia.



Inspection to fractional ten-thousandths of hydramatic airplane propeller distributor valve.

# **SPEED UP**

Parts feed automatically toward front—end reaching and fumbling. Bins taper toward front to form convenient semicircle—keep all bins within easy reach. Stacking, locking construction for rigid set-ups, easily changed when necessary. All-welded construction. Smooth, folded edges. New-design, adjustable hoppers provide increased capacity and permit regulated flow of parts according to sizes and weights. Two-sizes—tapered or straight sides.

## **IMMEDIATE DELIVERY**

Write Stackbin Corp., 1083 Main Street, Pawtucket, R. I.

Manufactured and sold  
in Canada exclusively by  
Wickware-Stackbin, Ltd.,  
Ottawa

## **STACKBIN**

"Stacked and



## **SYSTEM**

Still Accessible™

### Did You Know That---

**American Swiss File & Tool Co.**, formerly of Elizabeth, N. J., has moved into new quarters at 865 Mt. Prospect Ave., Newark 4, New Jersey.

— o —

**Tool Equipment Co.**, 24 S. Pulaski Rd., Chicago 24, Ill., has been appointed exclusive sales representative by Barth Stamping & Machine Works,

Inc., Cleveland, Ohio, producer of tools, dies, gages, and metal stampings, for Illinois Wisconsin, Iowa, and northern Indiana.

— o —

**William A. Marsteller** will resign, effective January 1, as vice president of the Rockwell Manufacturing Company of Pittsburgh and as vice president and director of Edward Valves, Inc., East Chicago, Ind., to establish

The Marsteller Company, consultants in marketing and advertising.

— o —

**Beaver Industries**, 1500 W. Adams St., Chicago 7, Ill., manufacturer of screw machine products, has announced the addition of a cold heading department for producing standard and special cold upset screws, studs, and rivets.

— o —

**Robert G. Van Keuren** has been appointed chief sales engineer for the Abrasive Division of Norton Company. Since 1945 Mr. Van Keuren has been a section head in the sales engineering department with the title of sales engineer.

## Here's your guide to lower metal forming costs on smaller jobs



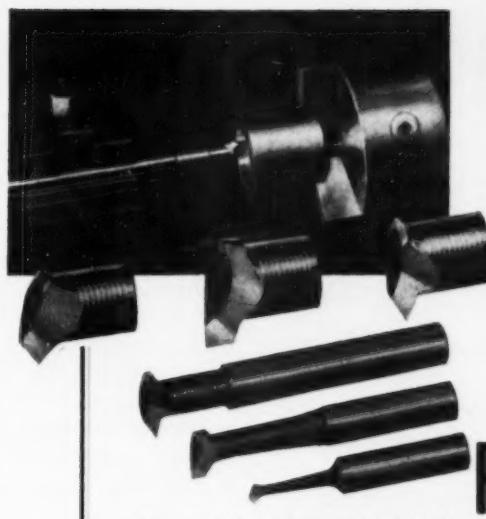
Verson Bulletin 16-48A gives complete design details, specifications and capacities for the new Verson 16-48 Press Brake — the machine that gives you big brake design at small brake cost. Write for your copy today!

### VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Ave.  
CHICAGO 19, ILLINOIS

Holmes St. and Ledbetter Dr.  
DALLAS 8, TEXAS

THERE'S A VERSON PRESS BRAKE FOR EVERY JOB  
FROM 15 TONS UP!



# BORING TOOLS

WITH EXTRA ADVANTAGES!

*All styles*

- for general boring
- for bottoming and facing
- for internal thread-ing

**Write for catalog**

**R.B. TOOL Co., Inc.**

41 East Hartsdale Ave  
Hartsdale, N.Y.

Has only to be resharpened by grind-ing top face.

The boring tools are made of super-high-speed steel or carbide tipped.

**4 MODELS**

"Junior"—18 ga. mild  
B1 for 14 ga. mild  
B2 for 10 ga. mild  
B3 for 3/16 ga. mild

**Beverly THROATLESS SHEAR**

*Cut any Shape... STRAIGHT OR IRREGULAR*



**B-3**  
With  
Ball Bearing  
Hold Down

Write for  
illustrated circular

You can make straight or intricate cuts in the lightest metals without distortion, yet handle heavier gauges with ease on a Beverly — "the Shear that experience built and performance made." Smooth, powerful, clean-cutting action of the Beverly has made it the preferred shear wherever metal is cut. Ask your Dealer to show you these superior metal cutting tools . . . or write for more details and illustrated circular.

Made in 4 sizes to handle 18 ga., 14 ga., 10 ga., and 3/16" mild steel. H. C. H. C. blades available for cutting stainless steel.

**BEVERLY SHEAR MFG. CO.**  
3000 W. 111TH STREET CHICAGO 43

## Did You Know That---

**Charles Pack**, formerly vice president in charge of production for Doehler-Jarvis Corporation, has been named vice president in charge of the newly formed engineering and research department of the company. **W. G. Gutmueller**, formerly vice president and secretary, has been named vice president and production manager.

**Louis Miller**, director of labor relations, has been appointed assistant vice president. **Harold L. Samuels**, formerly assistant secretary, has been named secretary, and **H. C. Mandeville** has been appointed assistant secretary.

— o —

**Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.**, has announced the appointment of **John T. M. Frey** as assistant manager of the

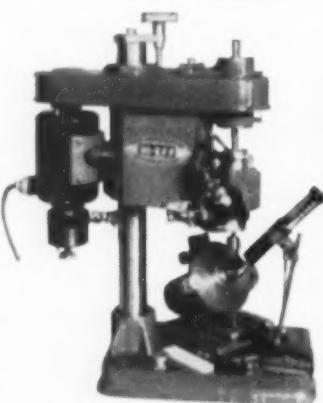
New York branch and **Lamar S. Hilton** as assistant sales manager of the abrasive wheel department.

— o —

**Austin C. Ross**, manager of the Buffalo Works of Worthington Pump and Machinery Corporation, has been elected a vice president of the company, but will continue to serve as Buffalo Works manager.

— o —

**B. C. Blake** has been appointed vice president and general manager of Connors Steel Co., Div. of H. K. Porter Co., Inc., Birmingham, Ala. He succeeds H. P. Bigler who recently resigned for reasons of ill health.



*Taylor*

**HI-EFF**

**PRECISION  
DRILLING  
MACHINES**

### Always Look For The FACTS THAT COUNT!

- Here are seven significant facts . . . They represent "HI-EFF" quality features for sensitive, precision drilling. Write for Bulletin 761.

1. Spindle and chuck run-out .0001.
2. Vaporized lubrication of bearings.
3. Spindle supported by 4 select, precision bearings—other moving parts precisely ground and lapped.
4. Solid column for maximum rigidity.
5. Variable speed—800 to 40,000 R.P.M.
6. Radial positioning of drill head.
7. Counter-balanced spindle affords sensitive, feather-touch feed.

*Dynamometers • Static Balancers • Precision Drilling Machines*

**TAYLOR DYNAMOMETER & MACHINE CO.**

5113-A WEST CENTER STREET

• MILWAUKEE 10, WIS.



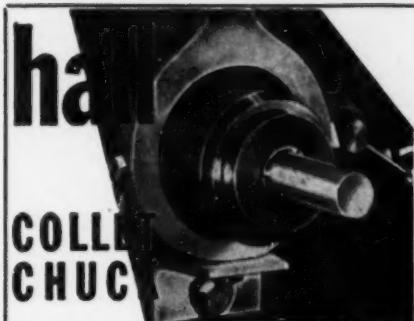
Mounts on any screw cutting lathe and produces a perfect thread independent of operator skill. Indexing system presents each of ten cutter teeth successively to the work allowing maximum cuts to produce a perfectly formed thread. Duplicates threads without gauging. Write for Bulletin 110.

**RIVETT**

LATHE & GRINDER, Inc.

MMSA-12 Brighton 35, Boston, Mass.

For more Precision Work  
RELY ON RIVETT, The Master Craftsman's Master Tools



SPEED UP production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

2-inch capacity, \$145; 3-inch capacity, \$295;  
1-inch capacity, \$95

Round, square or hex collets, plain—serrated

**HALL MANUFACTURING COMPANY**  
622 Tularosa Dr., Dept. B, Los Angeles 26

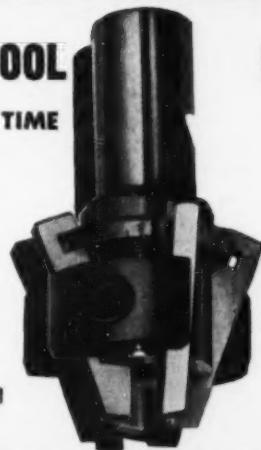
# KUTMORE ADJUSTABLE HOLLOW MILLS

## THE FINEST TOOL

### CUTS PRODUCTION TIME

- TURNING
- TAPERING
- FACING
- CHAMFERING
- TREPANNING

Any combinations of above in  
**ONE PASS**



## FOR PRODUCTION

- Exclusive MICROMETER ADJUSTMENT feature for rapid set up.
- Cutting capacities from  $1/32"$  to 2" diameter in standard stock.
- Blades quickly re-sharpened in COMPLETE SETS.

Write for Catalog No. 20MM

Our engineering department is at your disposal on your hollow mill problems.

**CARL WIRTH & SON, INC.**

1625 CLINTON AVE. NO.  
ROCHESTER 5 N.Y.

### Did You Know That--

Walter Geist, president of the Allis-Chalmers Mfg. Co., Milwaukee, Wis., has announced the election of **Dr. H. K. Ihrig** as vice president in charge of research. Dr. Ihrig was formerly vice president and director of laboratories of the Globe Steel Tubes Company, Milwaukee.

— o —

**William R. Staples**, formerly West Coast representative, has been appointed assistant to the manager of sales, Alloy Tube Division of The Carpenter Steel Co., Union, N. J. **Paul E. Kelly** takes over the West Coast duties formerly handled by Mr. Staples.

— o —

Gerotor May Corporation has announced the election of **J. M. Schiavetti** as vice president in charge of production. Mr. Schiavetti, formerly the corporation's purchasing agent, has been in charge of its manufacturing since 1948.

**John W. Thompson** has been appointed product manager of The Carpenter Steel Co., Reading, Pa. In his new position, Mr. Thompson will supervise stainless, alloy and tool steel sales and will continue to be responsible for product development, advertising and marketing.

— o —

**Carl E. Johnson**, board chairman of **Sterling Electric Motors, Inc.**, Los Angeles, Calif., has announced the acquisition by the company of a 11-acre site in Van Wert, Ohio, for the construction of a branch plant to serve the company's midwestern and eastern business.

— o —

**Harold K. Beck** has been appointed commercial vice president in addition to his present post as manager of the Washington office of Worthington Pump and Machinery Corporation, according to an announcement by W. H. Feldman, vice president in charge of sales.



THE millionth standard carbide tool produced during 1950 by Carboly Company, Incorporated, Detroit, is shown by Frank Pellegrino, Carboly inspector, to K. R. Beardslee (left), president, and E. F. Wambold (right), executive vice president of the company. The million does not include all the non-standard tools and tips supplied to other companies for the manufacture of tools.

**FOR**  
*Cost Reduction*

Snow Air-operated, Electrically Controlled Machines and Fixtures

- Single Spindle Verticals • Two-Spindle Verticals • Two-Spindle Horizontals • Automatic Nut Tapping Machines • Drill Press Tap Heads • Automatic & Semi-Automatic Jigs & Fixtures

Write for details

# SNOW

SNOW MANUFACTURING COMPANY  
435 Eastern Ave. • Bellwood, Illinois  
(Chicago suburb)

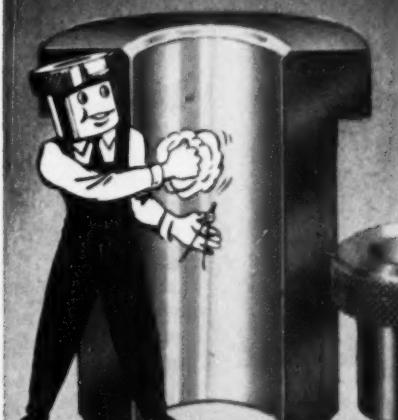
## Universal VERNIER CALIPER

FOR INSIDE, OUTSIDE AND  
DEPTH MEASUREMENT

An unusual value in a guaranteed, high precision instrument. Of Swiss make, it is equal in quality to the world's best. Made of stainless steel with hardened jaws and blade. Scale 7" long, measures 6". Vernier 1000ths and 64ths. Comes packed in de luxe leatherette case, for only . . . \$24. Full satisfaction guaranteed or money refunded after 10-day trial. Order direct (either C.O.D. or remit with order) from

PTI, Incorporated,  
Dept. MMS-12,  
New York 12, N. Y.

# PRECISION MADE



*American Drill Bushing  
CO., INC.*

FOR PERFECT ALIGNMENT  
and LONGER WEAR  
**AMERICAN DRILL JIG  
BUSHINGS**  
SAVE YOU MONEY

Send for catalog and name  
of nearest distributor

Look for the trade mark



## Book Reviews

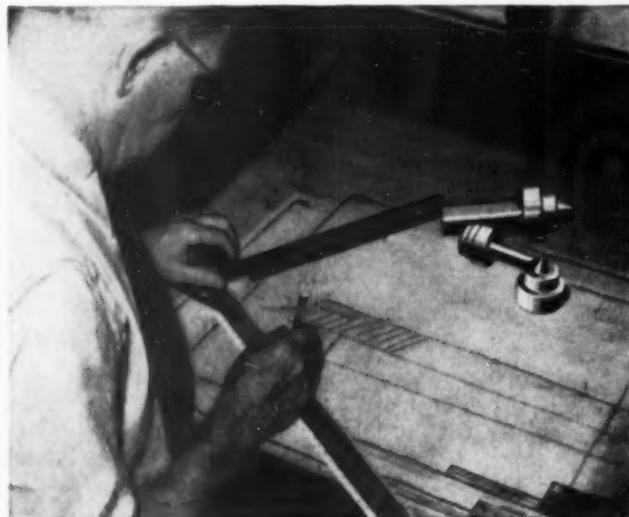
**Management Strategy in Collective Bargaining Negotiations.** By William J. Baade, Jr., with assistance of Morris Stone. Published by National Foremen's Institute, Inc., New London, Conn. 198 pages. Price, \$5.00.

This book is described as a practical working reference, providing employers and management negotiators "inside" information on how to execute contracts that promote peaceful labor relations and at the same time permit efficient business operations. The volume is divided into five sections that deal with the "know-how" of labor relations. They are: I. Why Unions Act as They Do; II. Union Management Relations and the Law; III. Basic Union Aims and Management Bargaining Strategy; IV. Safeguarding

Management Rights; V. Conduct at the Bargaining Table. In addition, there is an appendix that presents the text of the new Labor Relations (Taft-Hartley) Act, as well as a sizable index on specimen contract clauses. In these practical sections are actual specimen clauses used by companies in their labor agreements, including pointers on how to select the right clause to fit particular requirements. Also provided are tips on how to avoid the pitfalls that lead to legal difficulties.

**Modern Arc Welding Lessons A. C. & D. C.** Published by Hobart Trade School, Inc., Troy, Ohio. 192 pages. Illustrated. Flexible blue fabrikoid cover. Price, \$1.00 per copy with special prices to schools.

This book comprises the second part



**Engineered Live Centers . . .** A properly designed Live Center is one of the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job is set up with the right Live Center. Standard shanks with Morse taper carried in stock.

**STURDIMATIC**  
CO. LTD. COMPANY  
1904 F STREET • DETROIT 1E, MICH.

of the new five-part Hobart handbook "Electric Arc Welding—Procedure and Practice" and contains the complete series of 40 arc welding lessons offered at the Hobart Trade School. Chapter headings include: Preliminary Instructions; Starting and Manipulating the Arc; Welding Common Joints with Bare Electrodes; Welding Light Gage Sheets with Coated Electrodes; General Welding with Coated Electrodes in the Flat, Horizontal, Vertical and Overhead Positions; Pipe Welding; Welding Cast Iron; and Special Practices and Tests.

The text material, following the introduction and preliminary instructions, is divided into welding exercises of gradually increasing difficulty. The student is taken through the various problems involved in practical arc welding as rapidly as he can master the principles involved. The book, written in easy-to-understand language, provides all the fundamentals of arc welding, together with descriptive pictures, and charts.

**Design of Electrical Apparatus.**  
Third Edition. By John H. Kuhlmann. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 512 pages. Illustrated. Cloth binding, board covers. Price, \$6.50.

This volume presents practical methods for designing various types of electrical apparatus, including d.c. generators and motors, a.c. generators and synchronous motors, induction

## POWERFUL, NEW, BANTAM-SIZE



BASE MOUNTED TYPE  
SHOWN  
(Leg Mounted Type Available)



NEW 3-WAY VALVE  
Designed especially for use with above cylinders. Precision lapped stainless steel disc provide positive sealing action. Can be operated manually or mechanically.

## AIR CLAMPS

Do you know what a tremendous saving in time and muscular effort can be made by using air clamps for holding work in position to be processed?

Here are the new Schrader bantam-size Air Clamps—they save space and pack all the power possible into the least dimensions. Piston and body are ruggedly constructed for long hard use. Body is of precision-machined cast brass—easily maintained. Two types of mountings, base or leg; six models in each type—strokes of 1 to 2 inches; cylinder diameters 1", 2 $\frac{1}{4}$ " and 3".

There's a Schrader Air Clamp for every application. Write for complete catalog data sheet today.



**A. SCHRADER'S SON**  
475 VANDERBILT AVENUE  
BROOKLYN 17, NEW YORK, DEPT. MS-1

Division of Scovill Manufacturing Company, Incorporated

**HOLD THE TRUCK!**

**I JUST FINISHED  
THE HARDNESS TEST  
ON THE LAST  
BUSHING IN THIS  
SHIPMENT**

**EACH AND EVERY  
UNIVERSAL  
DRILL BUSHING  
IS TESTED FOR HARDNESS  
which assures longer  
bushing life**

**UNIVERSAL** 145-9  
**ENGINEERING COMPANY**  
**FRANKENMUTH 9, MICH. 6AM**

motors, and transformers. The author provides a sound theoretical background as well as a practical treatment of each of the machines considered. Each type of apparatus is taken up as follows: (1) explanation of the construction, (2) presentation of formulas and procedure, (3) review of design limits established by practice, and (4) illustration with specimen calculations.

In this edition, the design constants and design limits have been revised in line with the latest design practices. The characteristic curves of electrical sheet steels are plotted on semi-logarithmic paper, and the copper tables have been enlarged to include new wire insulating materials. In the d.c. design section, the sample design calculations have been revised in accordance with output constants. New values of insulation thickness and clearance for the armature slots have been adopted. A discussion of multiplex windings used on large capacity machines has been added.

The method for calculating the field current for the specified load and power factor for synchronous machines has been changed to agree with the procedure adopted by the American Standards Association. A method of predetermining starting torque, pull-in torque, and starting kva is given with sample calculations for single and double-cage starting winding. New methods for determining motor dimensions are also provided, in addition to a method of determining the effect of saturation in the leakage flux paths and of calculating the deep bar effect of squirrel-cage rotors. Moreover, a method for the design of small transformers used in control circuits and for power supply in electronic devices has been included.

**Winding Alternating-Current Machines.** By Michael Liwschitz-Garik, assisted by Celso Gentilini. Published by D. Van Nostrand Co., Inc., 250 4th Ave., New York 3, N. Y. 766 pages. Illustrated. Cloth binding, board covers. Price, \$8.50.

A book for winders, repairmen, and designers of electric machines, this volume comprises a comprehensive presentation of lap as well as wave windings. It contains new developments in integral-slot, fractional-slot balanced, and fractional-slot unbalanced lap and wave windings. Each chapter presents first the "know how" in order to make it possible for the reader to find the answer easily to his particular winding problem. This is facilitated by detailed information on coil insulation and a series of tables which show, without winding diagrams, all possible series and parallel connections for all pole numbers between 2 and 30 at the end of each chapter, general rules for the layout of windings

not listed in the tables are provided. The "why" is explained in appendices at the rear of the book where the reader may find the proof of the methods used.

Material is also presented on multi-speed windings, single-phase windings, reconnecting windings for changed operating conditions, and methods for locating faults in electrical windings.

*Only Utica gives you*

1

the skill, the "know how" and the quality of the world's largest manufacturer of drop forged pliers and adjustable wrenches. A line unequalled in length and variety.



2

Induction-hardened jaw surfaces on all adjustable wrenches. Prevent burring, give up to ten times longer wear.

3

"LUBRING" pliers, lubricated by ring of oil-bearing porous iron "floating" in the joints.

Utica Drop Forge & Tool Corporation, Utica 4, N. Y.

It pays to buy



**Aluminum Structural Design.** Prepared by Paul Brandt. Published by Reynolds Metal Co., 2500 S. 3rd St., Louisville, Ky., 130 pages, 6 x 9 inches. 144 illustrations, 39 tables. Wire binding.

Basic information on how to design load-carrying structures in aluminum is presented in complete and up-to-date form in this book, which is available without charge to designers, engi-

neers, architects, and other company officials who request it on their company letterheads. The discussion is broken down into chapters on figuring tensile stresses, compressive stresses, bending stresses, and shear stresses, as well as stresses in cylinders subjected to fluid pressure. Formulas and actual examples contribute to the usefulness of the book. A section is devoted to fabricating considerations and joining methods, including riveting, bolting, fusion welding, and spot welding. Additional chapters cover deflection and vibration problems.

Tabular matter includes 66 pages of tables presenting information on physical, chemical, and mechanical properties; a list of sizes, alloys, and tempers of available aluminum mill products; shear, moment, and deflection formulas for beams; column formulas; elements of sections for both single shapes and combinations of shapes; minimum bend radii for sheet and plate; and comprehensive rivet data.

NEW, IMPROVED

## NU-MATIC



### THE WHEEL WITH THE PNEUMATIC DRUM

With this Nu-Matic wheel the abrasive belt rides on a cushion of air contained in a rubber drum. Different pressures in the drum and different grits provide varied surface finishes. Deflate, and belts can be changed easily and quickly for grinding, sanding or polishing. Cut your labor, production and inventory costs with Nu-Matic grinding units. Adapters for  $\frac{3}{8}$ "-11 or  $\frac{1}{2}$ "-13 power equipment. (Specify size.)



Adaptable to bench,  
portable or flexible  
shaft power.

**NU-MATIC GRINDERS, INC., 10304 W. McNICHOLS RD.  
Detroit 21, Michigan**

UNiversity 3-2573

In addition, there are tables of data on other structural materials and tables on related general information such as decimal equivalents.

**Changing Concepts and Trends in Pension Planning** (General Management Series No. 148). Published by American Management Association, 330 W. 42nd St., New York 18, N. Y. 32 pages. Paper covers. Price, 50 cents.

This booklet, covering the changing concepts and trends in pension planning, is made up of papers written by Alexander R. Heron, vice president, Crown Zellerbach Corp., San Francisco; Cyrus S. Ching, director, Federal Mediation and Conciliation Service, Washington; Lee Laird, manager, benefits division, personnel department, Standard Oil Co. of California, San Francisco; William Wallace, executive director, savings and profit-sharing pension fund, Sears, Roebuck & Company employees, Chicago; and

Eugene Dougherty, insurance manager, Anheuser-Busch, Inc., St. Louis. The subjects covered in the booklet include the modern concept of social security, financial complications, effects on the mobility of labor, a fundamental economic problem, private pensions only a partial solution, practical aspect of inaugurating a pension program, case history of a profit-sharing pension plan, and insurance problem of management.

**STAKE**

high speed      fatigue free

**The ELECTROPUNCH**

Photo taken in customer's plant shows hand assembly and staking of 3500 electrical switch blades per hour. This versatile electric-impact hammer is used to swage, crimp, mark, rivet or cut. It is economical, mobile, compact. Just plug in to your nearest 115 v. outlet and begin work.

Write for complete descriptive folder.

**BLACK & WEBSTER, INC.**

311 PLEASANT STREET, NEEDHAM 92, MASS.

Also Manufacturers of the ELECTROPRESS for heavier duty jobs.

**Job Evaluation and Wage Incentives.** Edited by Carl C. Harrington. Published by Conover-Mast Publications, Inc., 205 E. 42nd St., New York 17, N. Y. 289 pages, 91 illustrations. Cloth binding, board covers Price, \$4.00.

The material in this book is designed primarily for the practical plant operating man who is interested in job evaluation and wage incentive plans. The book shows in a practical manner

the advantages of good job evaluation programs and wage incentive plans and explains how to set up these helpful production techniques so that they will work out successfully. The author of each chapter is an authority on his subject and has had considerable practical plant experience in working on the particular subject which he is discussing.

In addition, many of the chapters relate the actual experience companies

have had with their job evaluation and wage incentive programs. These chapters show the different methods used by various companies in establishing the programs, how they have obtained employee acceptance, and how the programs have worked out. From these studies the reader can select those plans, or portions of several plans, that might be best suited to the particular problems in his own plant. The sample charts and forms presented in the various chapters are those in regular use by many companies and plants today.



★ **PRODUCTION INCREASED FROM 18 TO 31 PIECES PER HOUR** machining pipe union from 18-8 stainless steel in single spindle automatic after changing over to Stuart's THREDKUT 99.

★ **PRODUCTION DOUBLED** boring 7½" dia. hole through 11" dia. x 30½" long solid forged 5060 steel pump liner through use of Stuart's SPEEDKUT B the multi-purpose cutting fluid.



D.A. **Stuart Oil Co.**

2741-47 S. Troy Street, Chicago 23, Ill.

**Incentive Plans for Direct and Indirect Workers** (Production Series No. 188). Published by American Management Association, 330 W. 42nd St., New York 18, N. Y. 24 pages. Paper covers. Price, 50 cents.

This booklet includes papers on incentive plans for direct and indirect workers by Paul Cain, chief industrial engineer, Armco Steel Corporation; James R. Bailey, supervisor of management and engineering section, E. I. du Pont de Nemours & Company, Inc.; Harrel M. Creasey, assistant plant manager, General Metal Products Company; and Denton K. Swartwout, president, The Swartwout Company. Controlling maintenance costs through incentives, an approach to incentives for indirect workers, a cooperative job incentive plan, and stimulating the employee's stake in the enterprise system are the subjects of the papers.

**Film Guide for Economic Education.** Published by Film Research Associates, 135 W. 52nd St., New York 19, N. Y. Price, \$1.50.

A descriptive catalog of motion pictures and slide films covering many phases of the American economic system, this guide, in addition to furnishing details on 134 films from 63 indicated sources, contains a preface by Dr. Louis S. Goodman, FRA's executive director, on the "film forum" technique of combining discussion with film presentations. Among the films described are "Basic Economic Concepts" (McGraw-Hill), "Capital" (Coronet Films), "Economics for Everybody" (Film Publishers), "The Price of Freedom" (NAM), "Productivity: Key to Plenty" (20th Century Fund), "Union at Work" (Textile Workers of America), and "What is Business?" (Coronet Films).

**Buy a  
BOX THAT LASTS!**

Sterling Stacking Boxes are designed and constructed to solve your handling problems . . . and save you money. "Top Rim" construction provides stronger support all around the box . . . assures positive stacking. Due to Sterling's method of manufacturing, any size stacking box can be made at standard costs. Other types of shop boxes also available.

Write for literature and prices.

Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.

**Sterling**  
Quality Handling & Storage Equipment

**Low Temperature Properties of Ferrous Materials.** Published by Society of Automotive Engineers, Inc., Special Publications Dept., 29 W. 39th St., New York 18, N. Y. 97 pages, 62 charts, graphs and photographs, 22 tables. Price, \$2.00 to S. A. E. members; \$4.00 to non-members.

Of particular interest to engineers and metallurgists concerned with military and civilian ground vehicles,

aircraft, welded marine vessels, ship plate, and chemical processing equipment, this report evaluates the effect of metallurgy, heat treatment, and design on the low-temperature behavior of ferrous materials. Particularly important to designers is a chapter dealing with methods of reducing stress concentrations and selection of steels for low-temperature service. Among other significant phases of the problem extensively covered in the report are test procedures and equipment for measuring low-temperature embrittlement.

The advertisement features a large, stylized 'dy chek' logo at the top. Below it, the slogan 'dye penetrant metal inspection' is written in a bold, sans-serif font. A central text block highlights 'Simplified Non-Destructive Testing... Any Metal—Anywhere'. Below this, another block of text emphasizes 'FASTER, CHEAPER, MORE ACCURATE' and 'Completely Portable, License-Free'. At the bottom left, there's a call to action: 'Write for Details'. On the right side, a small box contains the 'dy chek COMPANY' logo with an arrow pointing towards it, and the text 'Division of Northrop Aircraft, Inc.'

1541 EAST BROADWAY HAWTHORNE, CALIF.

Pensions and Fact-Finding in Labor Relations (Personnel Series No. 133). Published by American Management Association, 330 W. 42nd St., New York 18, N. Y. 28 pages. Paper covers. Price, 50 cents.

This booklet deals with pensions and fact-finding in labor relations and consists of papers covering the social and economic impact of the pension trend, main currents of union politics, and the

fact-finding concept in labor relations. The papers were presented at the Personnel Conference of A.M.A. held at the Palmer House in Chicago by Sumner H. Slichter, Lamont University professor, Harvard University, Cambridge, Mass.; Merlyn S. Pitzele, labor editor, "Business Week;" and Carroll R. Dougherty, professor of business economics, Northwestern University, Evanston, Illinois.

**The A-B-C's of Aluminum.** By G. W. Birdsall. Published by Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky. 96 pages. Illustrated. Heavy paper covers with wire binding.

This book tells, in simple and easy to understand language, who discovered aluminum and revealed its properties; what aluminum is, including its characteristics; how it is made into the products we see all about us; why it is used more than any other metal (except steel); where it is used today to enhance our lives in thousands of

ways; and the many important possibilities being explored for the future. The illustrations are arranged in sequence to present a pictorial story showing how aluminum is produced from raw ore, made into metallic aluminum and then processed into aluminum sheet, rod, bar, and other mill products. Pictures of typical fabricating operations, such as welding, forming, and the like, are included.

## FOR High Production AT Low Cost USE *Staples* The QUALITY Tools

FOR years, Staples Expansion and Solid Reamers and other carbide-tipped cutting tools have been known for their superior performance. You can specify Staples Tools with the assurance that their quality is never lowered to meet a price.

You can get *immediate delivery* from a standing stock of over 28,000 standard Staples carbide-tipped circular and single point tools.

If your requirements for *special tools* are slight alterations of standard tools, Staples can meet your special requirements and ship within several days.

Tell us your requirements. Send for complete tool catalog.

**THE STAPLES TOOL COMPANY, Cincinnati 25, Ohio**

*Staples*  
Distributors in Major Cities  
CARBIDE-TIPPED CUTTING TOOLS

A COMPLETE LINE OF SINGLE AND MULTIPLE POINT CUTTING TOOLS — EXPANSION REAMERS — FORM TOOLS — CENTERS — MASONRY DRILLS — SPECIAL TOOLS

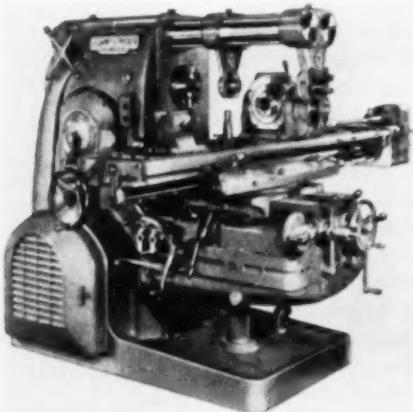


# New Shop Equipment

## General Purpose Knee Type Milling Machine

Designated as the Model CK, a general purpose knee type milling machine available in plain and universal styles and in five different sizes (No. 2, 3, 4, 5, and 6) has been announced by the Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis. Features of the machine include a spindle mounted flywheel which operates on three-bearing support; heavy duty table feed screw 2 inches in diameter; and positive backlash eliminator. The machine has high horsepower ratings and utilizes independent motor drives for the spindle and for feed and rapid traverse. Table feed and rapid traverse are operated through a monolever control, thus providing for ease of operation. Feed changes of from  $\frac{1}{8}$  to 90 inches per minute are provided to take full advantage of modern cutting tools.

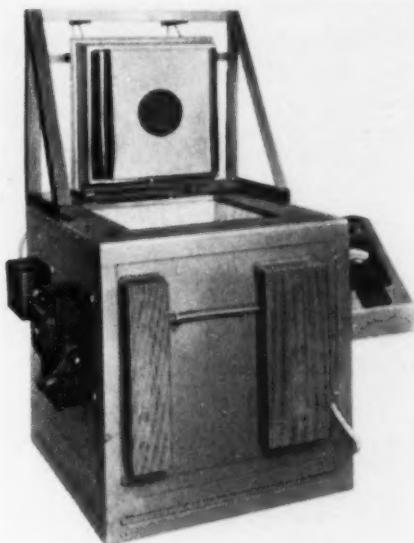
Spindle and feed motors are interlocked with an automatic safety control which prevents the cutters from stalling during overloading conditions. Non-glare rapid-set micrometer dials with satin finish and high contrast figures, as well as increment markings, provide for easy reading and quick, positive locking at each setting. Lubrication of the machine is effected through a forced flood system in the column and knee and a positive metered pressure pump system for the table, saddle and knee ways, and table feed assembly.



Kearney & Trecker Model CK Universal Style  
Milling Machine

## Vertical Electric Furnace

The K. H. Huppert Co., 6841 Cottage Grove Ave., Chicago 37, Ill., has an-



Huppert Vertical Electric Furnace

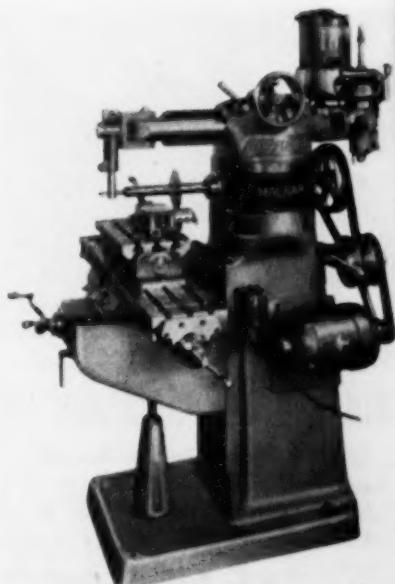
nounced a vertical electric furnace for many general and varied industrial applications, such as basket heating, steel hardening, and drying and firing of ceramics. The furnace is available in two models, one with an inside fan assembly for equalizing temperatures up to 1,250 deg. F. and another with a maximum temperature of 2,000 deg. F. without recirculation. The furnace features coiled Kanthal heating elements which are mounted in refractory plates located on the four sides of the 21 x 21 x 30-inch heat chamber. Full heat retention is said to be assured by multi-insulation, a heat-resistant Transite board top, and an asbestos seal recirculating door. (The asbestos seal recirculating door is replaced by a standard door on the higher temperature model.)

Constructed of heavy angle iron and 12-gauge body plates, the furnace is protected by a green Hammerloid baked finish, and all exposed metal parts within the furnace chamber are made of stainless steel. Overall dimensions of the furnace chamber are made of stainless steel. Overall dimensions of the furnace are approximately 60 x 48 x 72 inches.

## Horizontal Milling Unit for Vertical Millers

Designed for use on the Bridgeport vertical milling machine, a horizontal milling unit which is said to eliminate errors in resetting from vertical to horizontal operations is now being manufactured by the Mainar Machine & Tool Co., Inc., 19301 St. Clair Ave., Cleveland 16, Ohio. The unit utilizes a heat-treated precision-ground horizontal spindle capable of performing heavy end milling, fly-cutting, boring, drilling, and other operations. A standard No. 10 Brown & Sharpe taper spindle is furnished with the unit; however, a special taper to meet individual requirements can be supplied on order.

The Mainar Horizontal Milling Unit, ready for installation, includes a horizontal housing complete with precision spindle and Timken precision roller bearings; variable speed drive complete with pulleys and belts; horizontal milling arbor support; one 2-h.p. reversing switch; one 1-h.p. 220/440 volt 3-phase 60-cycle 1750 r.p.m. ball bearing motor; motor mounting base; belt guard; and the necessary mounting bolts.

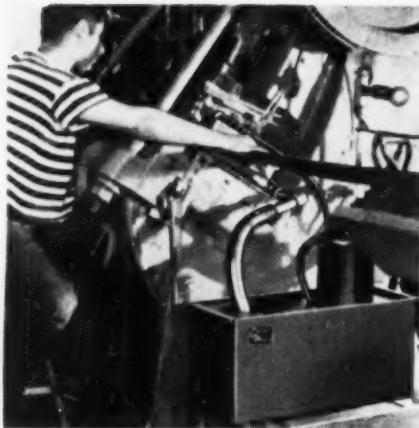


Mainar Horizontal Milling Unit mounted on Bridgeport vertical milling machine

### Automatic Lubricating System

Designated as the "Stocklube," a system designed to provide automatic pressure lubrication for the stamping and forming of roll, strip, and sheet stock has been announced by the Graymills Corp., 1948-52 Ridge Ave., Evanston, Ill. According to the manufacturer, the system ensures complete lubrication of both the top and bottom of the stock and also helps clean the stock by flushing off dirt and rust particles.

The Stocklube is available in 6, 12, and 24-inch sizes and is constructed of cast aluminum and steel stampings. The sys-



Graymills "Stocklube" System in use

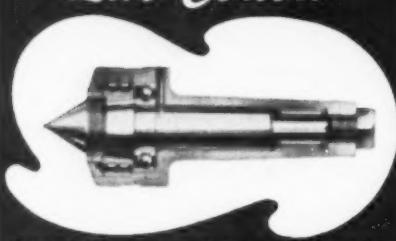
tem utilizes horizontal guides which are adjustable for any width of stock up to a thickness of  $\frac{1}{8}$  inch.

### Universal Vise

Designated as the "Univise" a universal vise which provides four separate distinct planes of adjustment for grinding, drilling, and milling operations has been introduced by the Delta Power Tool Division, Rockwell Mfg. Co., 602F E. Vienna Ave., Milwaukee 1, Wis. The vise consists of four parts, each of which can be rotated, thus permitting the vise to hold a tool at practically any conceivable angle. Each part has a circular scale of 360 degrees, and settings can be made directly from the blueprint.

The Univise is designed to fit any surface or tool grinder; however, because the keys in its base can be detached, it can also be used on a drill press or other

**NIELSEN**  
**Heavy Duty**  
**Live Centers**



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog  
M on live centers

**NIELSEN, INC. LAWTON, MICHIGAN**

### MILWAUKEE PRECISION EQUIPMENT

Surface Plates, Angles, Parallels, and Straight Edges are all backed by over twenty years of practical experience. You pay no more for this added assurance of accuracy and durability.

#### J. C. BUSCH COMPANY

Engineers and Machinists Since 1907  
136 E. Pittsburgh Ave. Milwaukee 4, Wisconsin



# THE MORE YOU COMPARE

Unless you have kept up-to-the-minute on the postwar developments in the new lighter, less expensive lathe field, you will be surprised at the tremendous advances in accuracy, capacity, speed, stamina and earning power that have been made in this field. You will also find, that the more you compare these new lathes, the more you will determine on a SHELDON Precision Lathe.



1. Zero Precision Taper Roller Bearings — most accurate made.
2. 1½" hole thru spindle—1" collet capacity.

3. 11¼" Swing.
4. Spindle run out accuracy within .0005.
5. Heavier carriage, wider bearing on bed.
6. 54" Bed held within .0005" of parallel alignment.
7. Reinforced steel cabinet bench with plate top.
8. Large double wall apron.

9. Standard big lathe controls.
10. Front Switch.
11. 8-speed, V-belt, enclosed under-neat motor drive.

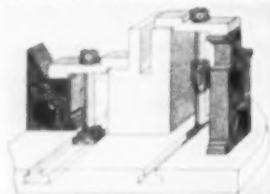
WRITE FOR CATALOG.

## SHELDON CHICAGO

SHELDON MACHINE CO., INC. • 4250 N. Knox Ave., Chicago 41, Ill.

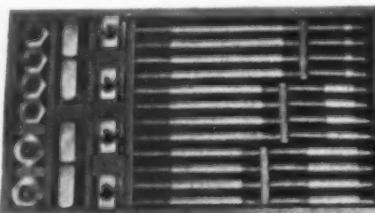
## TIETZMANN *Presents*

... A LINE OF TOOLS  
TO CUT COSTS, SAVE TIME



TIETZMANN is the originator of this  
**SURE GRIP STEP BLOCK.**

Sets . . . . . (A) \$20.30—(AH) \$14.35—  
(AW) \$7.00, Tool-makers' Set (B) \$5.85.



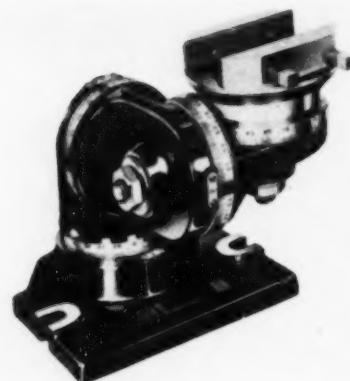
One of the most Complete T Nut and Stud Sets available—over 40 pieces — As low as \$15.50 per set.



AMAZING new RECIPROCATING ATTACHMENT for Drill Press only \$39.50, also ADJUSTABLE PLATE for Drill Press \$12.50.  
WRITE FOR COMPLETE DETAILS

## TIETZMANN TOOL CORP.

TOOL AND DIE MAKERS—EST. 1926  
315 N. Main St., Englewood, Ohio  
Phone ENG 59 8 miles north of Dayton, O.



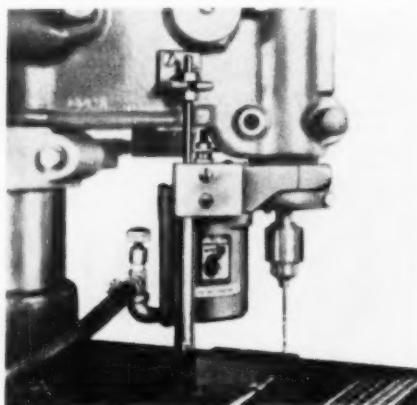
Delta Universal Vise

machine without table slots, as well as on a magnetic chuck. The vise measures 5½ inches high x 6 inches wide x 7½ inches long and has a jaw capacity for tools up to 1½ inches.

### Attachment for Drill Press Feed

A hydraulic check designed to provide uniform resistance for pneumatic drill press feed and other air cylinders has been introduced by the Mead Specialties Co., Dept. HC-42, 4114 N. Knox Ave., Chicago 41, Ill. The unit is said to afford a steady resistance to the power of the air feed or increase resistance at a definite point in the stroke. A short, stiff spring slows the advance of the drill just

Mead Hydraulic Check on drill press feed.



# A GIRL CAN BEND on a PEDRICK Bender



You do not need high priced labor to run a Pedrick Bender. A girl can do this job, and can adjust it, as well and as fast as your Master Mechanic or your highest priced production workers. This means a lot in a War Plant or peace-time production set-up where skilled labor is scarce. Pedrick Benders will bend pipes, tubes, strips and shapes.

**Write for our Bending Folder**

**PEDRICK TOOL and MACHINE CO.**  
3643 N. Lawrence Street      Philadelphia 40, Pa.

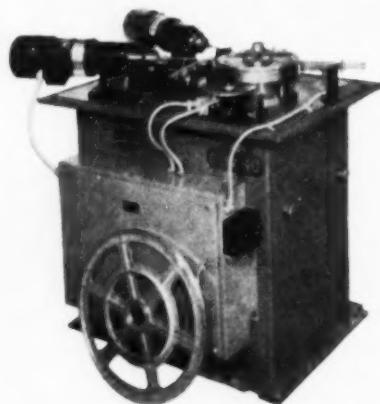
before it reaches the "break-through" point.

The hydraulic check can be easily attached to the drill press feed through two holes in the mounting block. The unit is connected to the head of the drill press by means of a small bracket. Two collars on the ram can be set at any desired point. The attachment can also be used with single-acting air cylinders.

### Drilling and Tapping Machine

A semi-automatic machine which is designed to drill and tap radial holes in parts of the type shown in the illustration

has been announced by the Govro-Nelson Co., 1933 Antoinette, Detroit 8, Mich. The machine incorporates a drilling unit and a tapping unit. As the operator hand-



Govro-Nelson Combination Drilling and Tapping Machine

#### Accurate Hole Transfer Made Easy With **NIELSEN TRANSFER SCREWS**

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. B sizes, from  $\frac{1}{8}$ " to  $\frac{1}{2}$ " U.S.S. Inexpensive — Last for years!



Write for Circular  
**NIELSEN TOOL & DIE COMPANY**

P. O. Box 1067  
Berkley, Mich.



#### WADE ENVELOPES

protect

Shop Orders, Drawings,  
Blueprints, Etc.

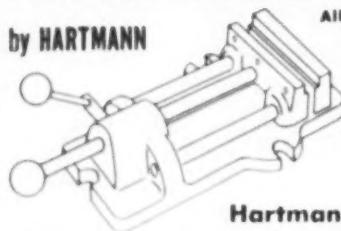
Made in three styles, transparent, fibre, and metal backs. Non-inflammable acetate windows. Special style or size to order. Write for details

#### WADE INSTRUMENT COMPANY

Dept. M, R.F.D. No. 1, Chardon, Ohio

#### INSTANT ACTION

by HARTMANN



#### RAPIDSET

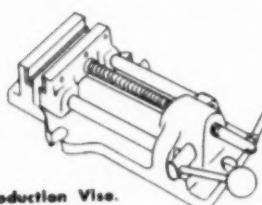
All Purpose Tool Room And  
Machine Shop Vises.

The

#### JAWSET

Adjustable Pressure Production Vise.  
For Information Write Dept. M

Hartmann Mfg. Co., 1637 Goold St., Racine, Wis.



### Dial Indicator

A dial indicator with accurate lever movement for the precision checking of variations in contour, dimension, or roundness is now being manufactured under the trade name of Geneva by Chicago Dial Indicator Co., Dept. B, 180 N. Wacker Drive, Chicago 6, Ill. According to the manufacturer, the indicator is particularly designed for precise indicating on a wide range of machining, layout, checking, and inspection work within 0.0001 inch. The indicator can also be obtained with graduations of 0.0005 inch and 0.001 inch.

Features of the indicator include an adjustable dial with positive internal lock for fine



Geneva Dial Indicator

settings; metal dial with clear reading graduations; convenient 2-inch diameter x  $\frac{1}{2}$ -inch thick size; case and plunger machined as one piece from solid brass casting; hard chromium plated finish; hardened ground, and draw-finished plunger; and special bearings for long wear and low friction. The indicator is furnished in a compact metal box complete with indicator, A. G. D. standard points, universal back, attachment for

internal testing, tool post holder, upright spindle, universal holding sleeve, threaded shank, and clamp for attaching to milling arbors, lathes, or planer tools.

### Air-Operated Cutter Attachment for Cutoff Machine

An air-operated cutter attachment for Steen Nos. 3, 6, and 12 high speed pipe and tube cutoff machines has been announced by the Continental Machine Co., 1952 Maud Ave., Chicago 14, Ill. Designed

## NEW tapping head SLASHES COSTS on large hole tap jobs!

- Production increased as much as 100%
- Drastic reduction in spoilage
- Greatly increased tap life

This new "TAP KING" tap head is revolutionizing methods . . . cutting production costs on difficult large hole tapping jobs. Daily production gains have run as high as 50-100%. Users report savings in parts spoilage, accurate maintenance of uniform tap depth . . . even on large blind hole tapping jobs!

Features include: Capacity of  $\frac{3}{8}$ " to 1" in steel and  $\frac{1}{2}$ " in softer materials; powerful friction clutch; exclusive spline drive; helical back gear reversing mechanism; aluminum housing and many other advantages.

Write for full details today!

PROCUНИER HIGH SPEED TAPPING HEADS are available in 4 sizes with capacities from No. 0 to  $1\frac{1}{2}$ ".

Procuниer Safety Chuck Co.,  
Dept. 12.

12 S. Clinton St., Chicago 6, Ill.  
Gentlemen: Please send me full details on the new Procuниer "TAP KING."

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



NEW! LARGER!  
Procuниer  
"TRU-GRIP"  
Tap Saver

Small size makes tapping easier close to walls or shoulders. It drives the tap by the square, holds it true by the round.

**Procuниer**  
**Safety Chuck Co.**

12 S. CLINTON ST.  
CHICAGO 6, ILL.

to increase production and reduce operator fatigue, the attachment includes a foot switch, air cylinder, and precision air controls, the cylinder and air controls accurately gaging the speed of blade approach to the pipe to be cut when the foot switch is depressed. A split-second hesitation is provided when the blade engages the pipe gently and starts it spinning. Then, a steady powerful pressure is applied to the cutoff wheel.

After the pipe has been cut off, the air cylinder retracts the blade to its original



Steen Pipe and Tube Cutoff Machine equipped with Air-Operated Cutter Attachment.

### DUAL CROSS and ROTARY FEED

#### PALMGREN Rotary, Index MILLING TABLE

No. 83 Only \$49.50  
Has 8" table, 360° movement and 4" cross feed travel. Adjusting wheels and dials graduated in degrees and thousandths.

Slotted for bolting to table. No. 82 without rotary feed \$39.75.  
Write for Circular No. 354.

CHICAGO TOOL and ENGINEERING CO.  
8399 South Chicago Ave., Chicago 17, Ill.

### Micro Supreme LAY-OUT AND IDENTIFICATION DYE

13 COLORS  
For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

### MICHIGAN CHROME & CHEMICAL COMPANY

6340 E. Jefferson Ave. • Detroit 7, Mich.

position, ready for the next cut. Air pressure can be quickly regulated from the control box, and the easily accessible control switch permits full control of the cutting speed of the cutter attachment at all times.

### Electric Impact Hammer

Black & Webster, Inc., 30 Pleasant St., Needham, Mass., has announced an electric impact hammer, known as the "Electropress," which not only delivers an impact up to 6,000 lb. but follows through with a "squeeze" or pressure of 2,000 lb.

FREDDY FEDERAL SAYS:  
IT'S  
**Federal** SHORT RUN STAMPINGS  
FOR YOUR EXPERIMENTAL AND PRODUCTION UNITS

Our Phenolic Stamping Service supplies phenolic stampings for insulators, spacers, terminal boards, gaskets, cams, etc. Any dimension up to 9" x 12" x  $\frac{1}{8}$ ". Any quantity from 3 pieces to 20,000.

Write for illustrated bulletin.

TOOL AND MANUFACTURING CO.  
5422 ALABAMA AVE. SE 3000 PARK  
MINNEAPOLIS, MINNESOTA  
QUALITY STAMPINGS IN SMALL QUANTITIES

**Independent laboratory test for a leading machine tool builder reveals**

## **WHY "BLU-MOL" OUTPERFORMS ALL OTHER BLADES TESTED**

Some time ago, a leading machine tool builder tried out a number of different hack saw blades under normal production conditions. "Blu-Mol" blades proved so outstandingly superior that the company decided to find out why and sent them to an independent testing laboratory. Here is the report they received:

Sample No. 407564

1-3-50

The "excellent" service given by this blade is apparently the result of three factors:

First, homogeneity of steel. The stock shows no evidence of high concentration of carbides in stringer formation which creates weak spots and brittleness.

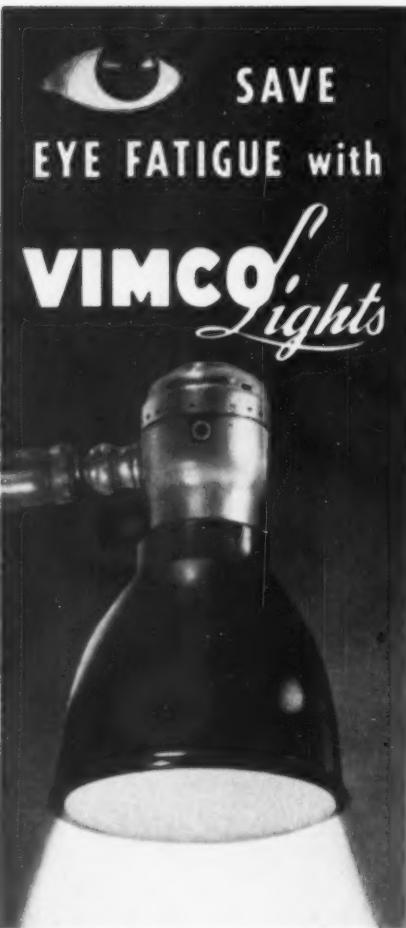
Second, the relatively high hardness (C64.5) combined with fine grain size gives the necessary combination of tooth strength and toughness needed for a long service life. Usually hardness above C64 is attained at the sacrifice of grain fineness.

Third, surface condition. There is no evidence of lowered surface carbon content so commonly found in hack saw blades. This manifests itself by greater resistance to tempering and a consequent retention of a larger percentage of white martensite.

"Blu-Mol" steel is part of the secret of "Blu-Mol's" tremendous cutting ability. But even more important is the exclusive, precision heat treating process used only on Millers Falls blades. Try "Blu-Mol" and see for yourself how this outstanding blade can cut your hack sawing costs. Write today for a demonstration on your own work, in your own machines.



MILLERS FALLS COMPANY  
GREENFIELD, MASS.

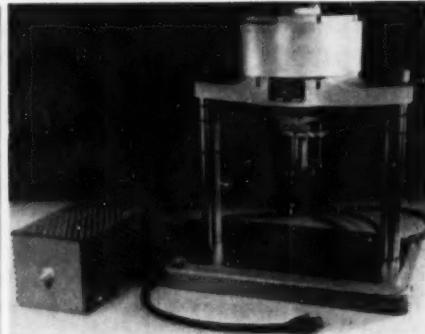


And when you prevent eye fatigue . . . you keep production up . . . you eliminate costly machine errors . . . and you help prevent personnel accidents. Remember, too, your customers expect your machines to be fully designed in every detail . . . that means they want the "on the point" lighting Vimcolights can provide. Vimcolights are easy to install, long lasting and backed by 30 years of specialized lighting.

**Send for bulletin 74**

**VIMCO MFG. CO., Inc.**

111 Brayton St. Buffalo, N. Y.



"Electropress" Electric Impact Hammer

pressure may be easily controlled with the addition of an impact control.

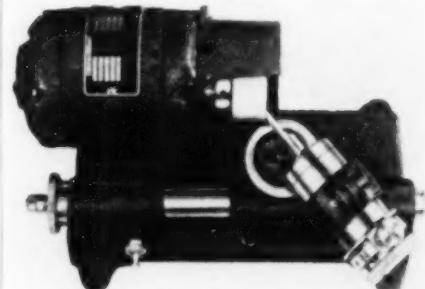
Ideally suited as a high speed production tool to stake, form, crimp, mark, bend, clinch, emboss, cut, rivet or punch, the hammer, it is claimed, is economical to operate, drawing less than 10 amperes from a 115-volt a.c. outlet. Designed for bench operation, the unit includes a spindle that is easily adjustable above work. The overall height of unit is 16½ inches and weight, 80 lb. Maximum length of stroke is 1¼ inches and working height below spindle in up position is 4¾ inches.

The standard model is equipped with a feather-touch instant-contact hand switch. The machine is also available with a foot switch or additional hand switch connected in series for safety of operator.

#### Precision Cutter Grinder

A precision cutter grinder designed for sharpening engraving cutters true to center has been introduced by New

New Hermes Precision Cutter Grinder



Hermes, Inc., Dept. 27, 13-19 University Place, New York 3, N. Y. The grinder utilizes an indexing unit attached to the spindle that permits the operator to grind any desired cutting profile with proper angles and clearance. The indexing plate also enables two, three, and four-fluted cutters to be ground and sharpened. The grinder is supplied with a cool cutting grinding wheel; however, a special diamond wheel is available on order for sharpening carbide-tipped engraving cutters.

The grinder is equipped with an adjustable clamp head for radius grinding. The rotating base of the cutter head has a 140-degree graduation, and the cutter feed dial is graduated in  $1/1000$  inch. The feed dial measures 11 inches long  $\times 6\frac{1}{4}$  inches high  $\times 3\frac{3}{4}$  inches wide.

### End Loading Boring Machine

An end loading boring machine, available in two models designated as the 425 and 426, has been added to the line of "Bore-Matics" marketed by The Heald Machine Co., Worcester 6, Mass. The machine differs from other Heald end loading models in the 221 and 321 sizes in that



Heald Model 425 End Loading "Bore-Matic" in use

the fixture and work are mounted on the bridge while the boring heads and motor are located on the machine table.

The Model 425 (illustrated) is arranged with a stationary fixture. The Model 426 is similar with the single exception that it has an indexing cross slide on the bridge which allows three workpieces to be loaded while three other pieces are being bored.



Hand-Powered  
"American" A-30



Motor-Powered  
"American" 2PB

bend pipe by hand or power with

"*American*"

cold pipe, conduit and heavy wall tube  
BENDING MACHINES  
Fast... Simple... Dependable...

### RADIANT HEAT BENDS In Standard Pipe

Fast . . . Accurate . . . Average bend takes only 10 seconds! Up to 180° bends . . . all sizes from  $1/2$ " to 2". Usual radiant heat bends for  $1\frac{1}{4}$ " at 6" and 9" radii can be supplied. Only 7 parts. Occupies 18" x 18" floor space.

Capacity  $1/2$ " to 2" standard pipe . . . Minimum radius 5 times pipe diameter up to 180° . . . Maximum radius 13". Complete with rolls for each size pipe. Standard motor equipment 2 h.p.

Special rodil supplied  
on request.

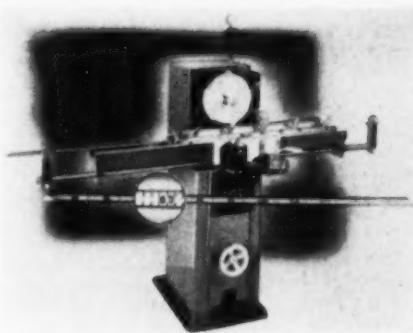
"*American*"

PIPE BENDING MACHINE  
Company, INC.  
Factory and Main Offices:  
14 Furnace St., Pultney, Vt.

## Scale Marking Machine

The Noble & Westbrook Mfg. Co., 25 Westbrook St., East Hartford 8, Conn., has announced the development of a scale marking machine for rolling lineal graduations and numbers permanently into articles such as metal typewriter paper ball bars, as well as other similar metal parts or products made of plastic, wood, or other materials. Designated as the Noblewest Model No. 306, the machine utilizes a steel roll marking die for producing the desired inscription in the workpiece and is designed to mark lengths up to 3 feet with speeds up to 300 lineal inches per minute.

The machine features an air-operated



Noblewest Model No. 306 Scale Marker



### "SHUR-GRIP" DROP FORGED HANDLES

Designed to hold 3 to 6 lb. lead hammer heads more firmly—will not slip—keeps hammer head in shape longer—to make remodeling easier, quicker, surer, less expensive. Write for folder.

**LAWRENCE H. COOK, INC.**

67 Massasoit Ave. E. Providence 14, R. I.



about the manhours lost when fasteners aren't accurately made. That's why

*W<sup>m</sup>H. Ottmiller co.*

of YORK, PENNA.

has acquired such a reputation for making the finest in:

CAP SET COUPLING MILLED  
SCREWS SCREWS BOLTS STUDS

Next time you order—be wise—

SPECIFY *Ottmiller*

work table that brings the workpiece into contact with the marking die which is mounted on a special geared motor drive on the main die spindle. The air provides marking pressure, and the depth of mark can be controlled by simply setting the air gage of the pressure regulator to the proper point. In addition, the air also compensates for variations in thickness from one part to another and for surface irregularities to produce a uniform depth of marked inscription. The machine is furnished complete with motor drive, starter and reversing switch and with pneumatic controls for connection to existing air lines having 80 lb. pressure.

### Multi-Character Hand Stamp

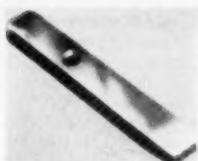
Quality Die Co., 9308 S. Baltimore Ave., Chicago 17, Ill., has added to its "Economy Brand" line of stamps a steel multi-character hand stamp which is available with various popular descriptive words, steel trade names, codes, serial numbers, fractions, and so on. The stamp, furnished with  $\frac{3}{8}$ -inch high characters, is  $3\frac{1}{2}$  inches long, and can be ob-



**DRILL THESE HOLES  
BY A QUICK, EASY, INEXPENSIVE METHOD**

Your business letterhead will bring literature.

**WATTS BROS. TOOL WORKS**  
Wimberly, Pa.



"Economy Brand"  
Multi - Character  
Hand Stamp

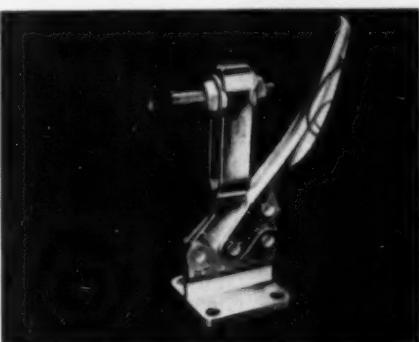
with the set. Each stamp is marked on the thumb side and top for easy identification. A hole is also provided for conveniently hanging the stamp on a nail.

### Toggle Clamp

A compact quick-acting toggle clamp for production work-holding fixtures has been announced by Detroit Stamping Co., 349 Midland Ave., Detroit 3, Mich. Designated as the "De-Sta-Co" No. 235-U, the clamp features holding pressures up to 650 lb. with smooth, fast toggle action. The clamping bar moves into a fully-retracted vertical position when the clamp is opened, allowing maximum clearance for quick insertion as well as

for rapid removal of the work.

Precision stamped from heavy gage steel, the clamp features a handle designed with full hand clearance for easy, safe operation and a rubber-tipped bolt assembly which is adjustable both horizontally and to work height. The clamp



"De-Sta-Co" No. 235-U Toggle Clamp

measures 2 $\frac{3}{4}$  inches high x 10 $\frac{1}{4}$  inches long when closed and weighs 1 $\frac{1}{4}$  lb. Open height is 6 $\frac{1}{4}$  inches.



One furnace for all heat treating jobs is well demonstrated by another enthusiastic Delaware user.

Every day the Flannery Bolt Co. runs the full range of tool steels from carbon to high speed in their quick-heating Delaware Furnace. There is no de-carburization and work is completely scale-free due to the simplified controlled atmosphere system.

YOU can confidently and economically heat treat in your own shop with the easy-to-operate Delaware Furnace.

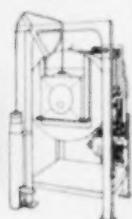
INFORMATIVE DATA is in 16-page Bulletin F-1. Send for your copy.

### DELAWARE TOOL STEEL CORP.

WILMINGTON 99

DELAWARE

DELAWARE  
Controlled Atmosphere  
FURNACES



### Transfer Screw

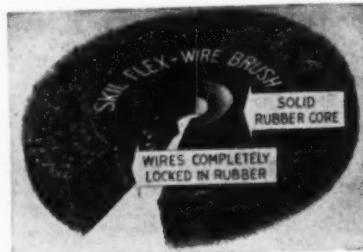
A transfer screw designed primarily to aid in locating a die in proper relation to a punch on commercial die sets is now being marketed by the Heimann Mfg. Co., 330 Lincoln Ave., Urbana, Ohio. The screw is applied by means of a special self-contained holder and wrench available with each set of six screws. The height of the hardened point is uniform from the top face of the hex.

The screw is available in sizes ranging from  $\frac{1}{8}$  to 1 inch U.S.F. and in all S.A.E. sizes. The screw can also be used in a wide variety of other applications, such as locating fixtures, air cylinders, chucks, and repairs.



Heimann Transfer  
Screw

spatter, and surface imperfections from castings, metal parts, and fittings has been announced by Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill. The wires of the brush are set in a solid rubber core which is said to reduce the danger of flying bristles and permit the use of the brush down to the core. The rubber holds each wire securely, yet allows the wire to "give" without bending. Individual wires are kept in an upright position, thus providing for a maximum

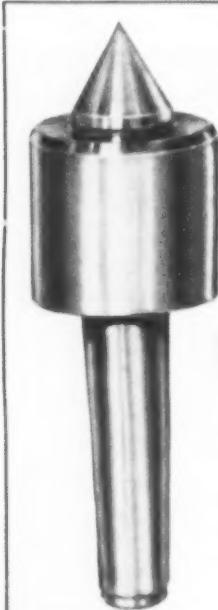


### Wire Brush

A wire brush designed for various power brushing operations, such as removing scale, rust, carbon paint, weld

"Skil" Flex-Wire Brush amount of cutting points in contact with the work.

The "Skil" Flex-Wire Brush is available in 4, 6, 7, and 8-inch diameters.



- Constant demand for many years
- Accuracy and durability guaranteed
- 4 rows of precision ball bearings
- Satisfactory delivery
- Available through your regular supply dealer
- Write us for circular

**QUADRO**  
*Precision*  
**LIVE CENTERS**

## PRECISION IN EVERY TURN

(GUARANTEED ACCURACY  $\pm .0001"$ )

**DAKON**

TOOL AND MACHINE CO., INC.

416 BROADWAY BKLYN 17-NY

## Deburring Tool

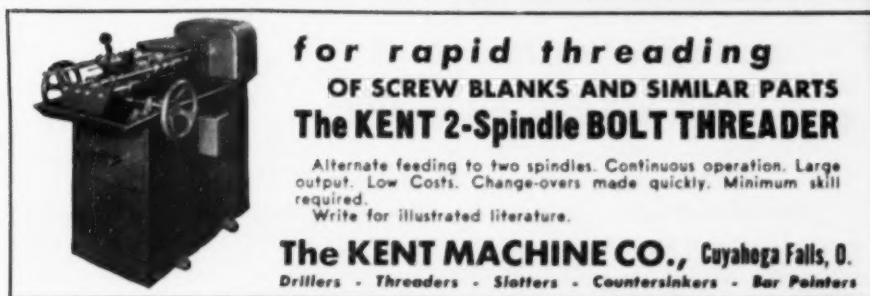
To meet the demand for tools of small pilot size for deburring and chamfering holes as small as  $\frac{1}{8}$  inch, Nobur Mfg. Co., 717 N. Victory Blvd., Burbank, Calif., has developed a tool for fast, efficient deburring of  $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{5}{16}$ , and 0.189-inch holes. Designated as the Series "DS," the tool can be operated in a drill press or power spindle and includes a free wheeling knurled sleeve which may be actuated by the operator while the spindle continues to rotate so as to project the cutting blade to working position and to retract it within the diameter of the pilot shaft, thus enabling the cutter head to



#### Nobur Series "DC" Deburring Tool

be introduced into otherwise inaccessible areas of multi-walled parts.

The cutter blade is rigidly supported by the pilot shaft to prevent blade deflection. In addition, in its projected position, the blade is firmly locked by engagement of a pin within a slot in the shaft body.





Lyon Metal Toolbox

A metal toolbox now being marketed by Lyon Metal Products, Inc., Aurora, Ill., incorporates a cantilever tray with five compartments that swing smoothly and easily to one side as the top is opened, thus providing sufficient space for reaching the contents of the box.



*T*HE year has been good to us—as we hope it has been to you—and in appreciation for all its blessings we pause from concerns of business to extend to our customers and friends the old but sincere double wish—

## Merry Christmas and Happy New Year

THE WELDON TOOL COMPANY  
3000 Woodhill Road • Cleveland 4, Ohio



### Metal Toolbox

A spring forces the padlock hasp tightly over a staple whenever the top is closed.

The toolbox measures 15 inches long x 6½ inches wide x 6½ inches high and has a metallic bronze finish.

### Slide Calculator

A slide calculator which provides a quick and convenient means of obtaining standard thread plug and ring gage dimensions under the new Unified and American Screw Thread Standards has been announced by The Taft-Peirce Mfg. Co., Woonsocket, R. I. Designed for inspectors, designers, and key shop personnel in the

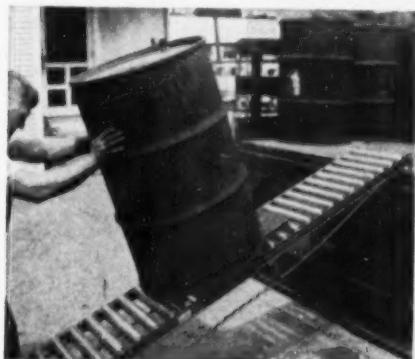


Taft-Peirce Slide Calculator

metal-working industry, the calculator determines in one setting major and pitch diameters for "go" and "not go" plug gages in Classes 1B, 2B, and 3B, and minor and pitch diameters for "go" and "not go" thread ring gages in Classes 1A, 2A, and 3A. The calculator is available for the price of \$1.00.

## Gravity-Operated Loading Ramp

Metzgar Co., 412 Douglas St., N. W., Grand Rapids, Mich., has increased the load-handling capacity of its "Save-A-



"Save-A-Hoist" Gravity-Operated Loading Ramp in use

Hoist" Gravity-Operated Loading Ramp more than one-fourth by the addition of bridge type underbracing, as shown in

the accompanying illustration. Designed to serve as standard equipment in trucks handling medium-heavy jobs and to reduce the time or manpower required in loading and unloading operations, the ramp is made in a standard length of 10 feet equipped with grab hooks to prevent slipping on the truck bed, and is available in a wheel type in widths of 11½ inches (10 wheels per foot), 15 inches (16 wheels per foot), and 18 inches (18 wheels per foot), and in a roller type in widths of 15 and 18 inches with 4 rollers per foot.

Wheels and rollers are mounted in ribbed steel channels braced with welded steel cross members and operate on dust-resisting ball bearings, factory lubricated for life. Either type of ramp is said to accommodate medium-heavy flat based objects and, when used with a board or pallet, will handle bags, crates, drums, or bundles with equal ease.

## Gang Vises

Two gang vises designed primarily for use in the precision grinding of small parts have been introduced by the Dery Tool & Die Co., Pine Meadow, Conn. The vises are available in three and six-posi-

# Precision HI-SPEED DRILLING

## .004 - .156"

- Fingertip Variable Speed
- Fast Approach Air Feed
- Hydraulic Feed Control
- Electric or Manual Controls
- Deep Hole Drill Cleaning
- Sensitive Precision Spindle
- 1000-10000, 2500-15000 RPM
- Priced from \$130.00 Complete

Write for Helpful Bulletin



8" Bench

16" Bench



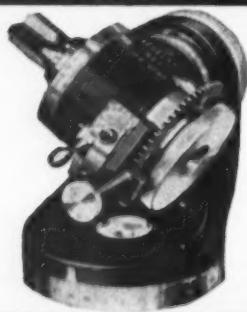
### 'Speed-Right'

CONTROLLED SPEED  
DRILLING MACHINES

The Electro-Mechano Co.  
265 East Erie St.  
Milwaukee 2, Wisconsin

tion models, each incorporating equalizing blades which automatically compensate for differences in work tolerances. The three-position model is constructed for use with a magnetic chuck but may be modified for clamping to conventional chucks. This vise holds work in a central position, thus making it possible to "flop" the fixture for grinding the opposite sides without additional adjustments. Standard capacity for the three-position model is  $\frac{3}{4} \times 1\frac{1}{2}$  inches, and the V-block vise face is provided to meet users' specifications.

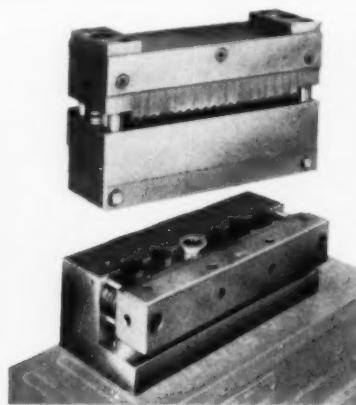
## TOOL HOLDER INDEXING HEADS



Hold 1/16" up to 1 1/2" Collets  
SC or IAM Collets and Brown & Sharpe or Morse Taper. Will adjust to any compound angle.

**GRINDERS & FIXTURES INC.**  
8329 Clinton Road Cleveland 9, Ohio

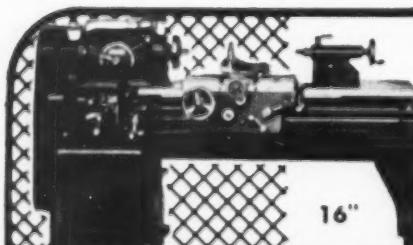
The six-position gang vise is designed for use on magnetic or non-magnetic chucks and has a standard capacity for



Dery Gang Vises

parts ranging from  $\frac{1}{8}$  to 1 inch. The unit features a vise face which holds parts against a smooth, lapped surface for maximum accuracy in grinding precision parts. Central positioning of the work makes fixture "flopping" possible without adjustment, and the width of the fixture may be specified to accommodate parts requiring grinding of both ends. Equalizing blades, available in shapes cut to fit work specifications, can be supplemented by adjustment screws which maintain parallel jaw openings.

For further information on any product mentioned in this issue—use the READER SERVICE CARD between the covers.



**THE CARROLL & JAMIESON MACHINE TOOL CO.** RAVENNA, OHIO, U.S.A.

## CARROLL AND JAMIESON LATHES

- This 16" lathe is equipped with 12 speed geared head, motor drive, and Timken mounted spindle. It's modern in design — with liberal dimensions.

Write today for descriptive bulletin.



## *was this call necessary?*

**Some "Moral Insurance" here might have avoided a serious accident**

Workmen's compensation is a fine thing—but it can't replace a mangled arm.

Safety laws prevent many accidents—but they can't cover every hazard of an individual plant.

Accident prevention which goes beyond the law is an unwritten responsibility of every employer. It is his "Moral Insurance" for his employees' welfare.

The premiums for "Moral Insurance" are not high. They do not have to be paid for in fancy safety gadgets. Their cost is simply the institution of common sense safety regulations covering all local hazards—enforced by employee committees with the full support of management.

Yes—"plant safety" is a mutual job.

**DON'T FORGET—THE LIFE YOU SAVE MAY BE YOUR OWN**



*Published in the public interest by:*

**MODERN  
Machine Shop**



Hilliard Slip Clutch

To help solve the problem of maintaining constant tension of constant torque on winding operations, The Hilliard Corp., 117 E. 4th St., Elmira, N. Y., has designed a slip clutch which is also said to be useful as a safety device for overload protection or to maintain constant

### Slip Clutch

torque regardless of driving speed. Special features include ventilated plates, cooling fins, and pressure springs with long deflection range for accurate adjustment.

The clutch is offered in sizes from 2 $\frac{1}{2}$  to 27 inches in diameter with torque range up to 10,000 foot-pounds and heat capacity up to 8 $\frac{1}{2}$  horsepower.

### Tap and Reamer Aligner

A tap and reamer aligner which provides a fast, easy method for accurately holding and guiding a tool in hand tapping and reaming operations has been announced by the Forest City Bit & Tool Co., 1200 Kishwaukee St., Rockford, Ill.

**WHITNEY METAL  
TOOL COMPANY**

**39 YEARS EXPERIENCE**

### WHITNEY-JENSEN

No. 72 Series

#### POWER SQUARING SHEAR

Fast, dependable machines for jobbing or production work. Models feature fly-wheel and motor enclosed between steel plate housings, high speed for production runs, simplified blade adjustment.

36" and 42" width, 16 ga. capacity  
42" width, 14 ga. capacity  
60" width, 12 ga. capacity

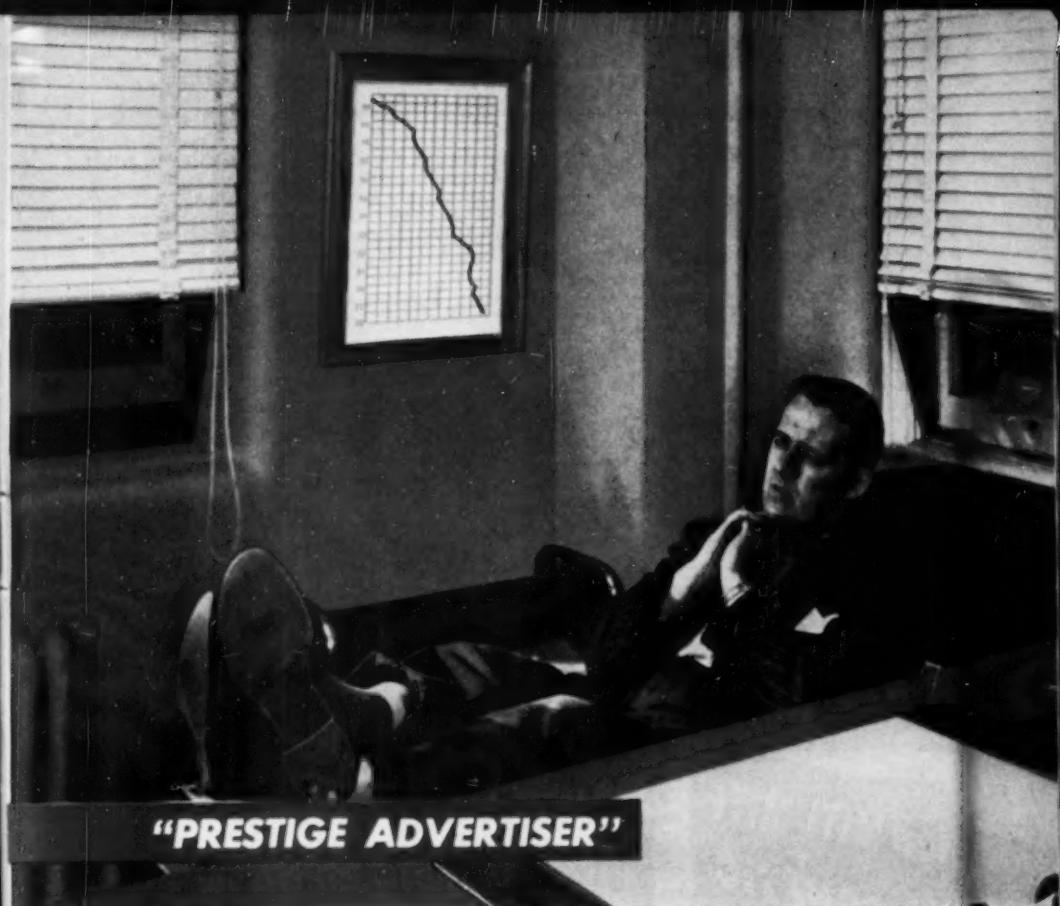
**WHITNEY METAL TOOL COMPANY**  
**110 FORBES STREET, ROCKFORD, ILLINOIS**



Forest City Tap and Reamer Aligner in use

The unit consists of a holder made of high grade steel, hardened and ground, with heat-treated steel jaws, and a guide which is constructed of close-grained cast iron with a precision ground sleeve and base to provide for accurate alignment.

The aligner is available in three sizes to accommodate tool shanks ranging from  $\frac{1}{8}$  to  $\frac{1}{2}$ -inch square.



## "PRESTIGE ADVERTISER"

Here's a fellow with lots of patience. He's waiting for results from his advertising in "prestige magazines"... waiting for inquiries that aren't coming in. His sales are going to pot—but boy, is he building prestige!

### **WHAT HE DOESN'T UNDERSTAND IS**

that prestige without sales is non-negotiable at the bank. Actually, fast-acting MODERN MACHINE SHOP, which blankets the metal working industry, can give him a more profitable kind of "prestige"—the pres-

tige that results from profitable volume sales. Advertising in MODERN MACHINE SHOP gets tangible results. *RESULTS TELL THE STORY*. Gardner Publications, Inc., Cincinnati 2, Ohio.



## New Shop Literature

**Multi-Spindle Drill Heads.** A 20-page two-color bulletin published by the Thriftmaster Products Corp., 1002 N. Plum St., Lancaster, Pa., describes and illustrates its line of multi-spindle drill heads and tapping attachments, as well as the Auto-Reverse Tap or Drill Unit.

**Contour Wheel Dressers.** Hoglund Engr. Co., Union, N. J., now has available a series of three four-page bulletins illustrating and describing a universal contour wheel dresser, automatic contour wheel dresser, and contour wheel dresser for cylindrical grinders, respectively.

**Vises, C-Clamps, and Work Positioners** are described in a 36-page illustrated catalog (No. 101E) released by the Wilton Tool Mfg. Co., 925-G Wrightwood Ave., Chicago 14, Ill. Specifications, prices, and dimensional diagrams are included.

**Slitting and Slotting Saws.** A four-page two-color bulletin (No. 250) issued by the Motch & Merryweather Machinery Co., 715 Penton Bldg., Cleveland 13, Ohio, describes and illustrates "Triple-Chip" slitting and slotting saws which range in size from 3 to 8 inches in diameter and from  $\frac{1}{2}$  to  $\frac{3}{8}$  inch wide. Information on dual drive adapters is included.

**Horizontal Milling Unit.** A four-page two-color bulletin released by the Malnar Machine & Tool Co., Inc., 19301 St. Clair Ave., Cleveland 10, Ohio, provides illustrated and descriptive information on a horizontal milling unit which allows for horizontal milling on a Bridgeport vertical milling machine. A detailed installation diagram and other helpful data are included.

**Rectifiers** equipped with electronic time delay switches and specifically designed for industrial use in connection with magnetic chucks, magnetic lifts, direct current motors, and so on, are shown, described, and tabulated as to standard stock size in a four-page two-color bulletin (No. R62) issued by Electro-Matic Products Co., 2237 N. Knox Ave., Chicago 39, Illinois.



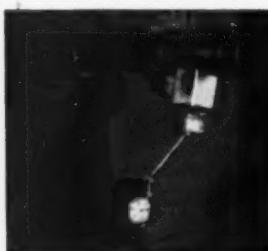
- Mounts on Flat or Curved Surface
- Adaptable to any Position
- 50 lb. Magnetic Pull

### PRICE LIST

Each Packaged in Wooden Box

Model 100 Indicator Holder	\$ 7.00
Model 200 Handi-Lite	7.50
Model 300 Combination of both	14.00

### A Third Hand for Machinists



#### ELIMINATES ALL CLAMPING

Place the Miti-Mite magnetic holder against any round or flat iron or steel surface. Holds test indicators. No clamps needed. Saves time trying to find suitable place to clamp. Powerful Alnico magnet exerts 50 lb. pull. Ball and socket and swivel arm construction gives versatile adjustment. Indicator Holder has  $7\frac{1}{2}^{\prime \prime}$  dia. stem, which handles most indicators.

Order from your mill supply dealer or send order with name of your mill supply dealer. Ask for Bulletin No. 600.



#### CONCENTRATED LIGHTING

The Miti-Mite Handi-Lite with magnetic base, is ideal for dark, hard to get at corners, and jobs requiring pin-point lighting. Special 40 watt bulb throws concentrated light. Adjustable shield prevents glare in operator's eyes. Outside of shield has special rayon coating to prevent heat from being transmitted from bulb to shield. Equipped with oil resistant plastic cord.

**ENCO MANUFACTURING CO.**

Dept. 1120 • 4522-24 W. Fullerton Ave. • Chicago 39, Illinois

**IMMEDIATE DELIVERY**  
**Extra Long Length**  
**High Speed DRILLS**

**Straight Shank  
No. 1 - 60**

No. By Gage	Length Inches	Our Price Net Each	Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net
1 to 10	6 1/4	\$1.00	13/32	12	9	\$3.05
11 to 20	5 3/4	.90	27/64	12	9	3.30
21 to 30	5 5/8	.80	29/64	12	9	3.60
31 to 40	5 1/4	.70	15/32	12	9	3.60
41 to 50	4 1/2	.60	31/64	12	9	3.60
51 to 60	4 1/4	.50	1/2	12	9	3.60

**Straight Shank**

Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net	17/32	15	12	\$7.00
1/8	12	9	\$1.65	19/32	15	12	8.25
9/64	12	9	1.65	5/8	15	12	8.80
5/32	12	9	1.65	21/32	15	12	9.00
11/64	12	9	1.65	11/16	15	12	9.10
3/16	12	9	1.65	23/32	15	12	9.35
13/64	12	9	1.76	3/4	15	12	9.50
7/32	12	9	1.76	25/32	15	12	10.50
15/64	12	9	1.95	13/16	15	12	12.00
1/4	12	9	1.95	27/32	15	12	12.65
17/64	12	9	2.05	7/8	15	12	13.20
9/32	12	9	2.05	29/32	15	12	13.75
19/64	12	9	2.20	15/16	15	12	14.30
5/16	12	9	2.20	31/32	15	12	15.40
21/64	12	9	2.50	1	20	15	17.60
11/32	12	9	2.50	1-1/16	20	15	18.70
23/64	12	9	2.75	1-1/8	20	15	19.80
3/8	12	9	2.75	1-3/16	20	15	22.00
25/64	12	9	3.05	1-1/4	20	15	24.00

**VICTOR MACHINERY EXCHANGE, Inc.**

251 Centre St.

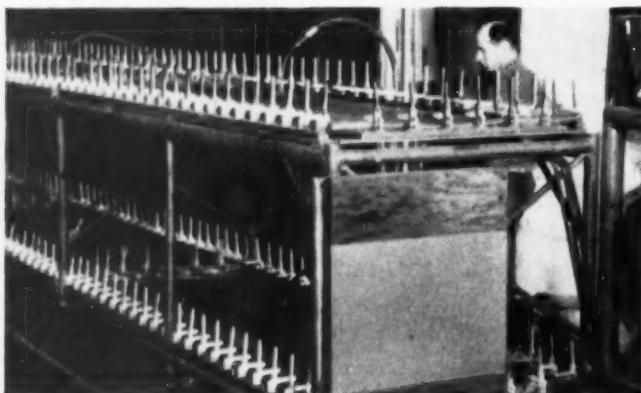
Phone: CANal 6-5575

New York 13, N. Y.

**Dial Indicators.** Chicago Dial Indicator Co., 180 N. Wacker Drive, Chicago 6, Ill., has prepared a six-page two-color pocket-size folder illustrating and describing a line of dial indicators for use by machinists, toolmakers, and inspectors in performing precision checking operations.

**Disc Filters** designed for filtering up to 125 gallons of coolant per minute are illustrated and described in a two-color leaflet available from U. S. Hoffman Machinery Corp., Filtration Div., 219 Lamson St., Syracuse 6, New York.

## Another battery of **KNU-VISE CLAMPS** to expedite production of hundreds of B-36 parts



Knu-vise clamps are installed on this special table fixture in Consolidated Vultee's San Diego plant to provide an air-tight seal around a rubber blanket. Beneath the blanket are parts for B-36 bombers which are joined by Metbond (a metal adhesive) instead of rivets. The fixture is moved into a furnace where heat and pressure are applied.

The quick acting clamps expedite production of hundreds of B-36 parts—the clamps can be secured and unlocked in a fraction of the time required if screws were used.

Approximately 800 Knu-vise clamps are installed on fixtures in Convair's Metbond assembly department. On this fixture, the clamps are spaced at 5-inch intervals. *Send for Complete Catalog*

*Sales Representatives in Principal Cities*

**KNU-VISE  
PRODUCTS** LAPEER MFG. CO.  
3056 DAVISON ROAD • LAPEER, MICHIGAN

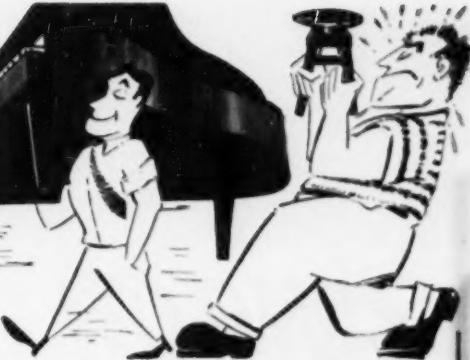
Western Division, 422 Magnolia Street, Glendale, California  
Canadian Stocking Distributor: Higginson Engr. Sales  
P.O. Box 23, Hamilton, Ontario

**Magnetic Chuck Control**, known as the "Neu-T-rol" and designed to facilitate the removal of the workpiece at the completion of the grinding operation, is fully illustrated and described in an eight-page two-color bulletin (No. 21) published by Electro-Matic Products Co., 2237 N. Knox Ave., Chicago 39, Ill. Covered are manually controlled models primarily designed for the smaller sizes of electromagnetic chucks ranging from 4 x 8-inch rectangular size up to 7 x 24 and 8 x 22 inches and circular chucks up to 14 inches in diameter; also, motor controlled models arranged for remote control with finger-tip operation and designed for the larger size electromagnetic chucks.

**Spiral Ratchet Screw Drivers.** A 16-page pocket-size folder issued by North Bros. Mfg. Co., Philadelphia 33, Pa., illustrates and describes 22 timesaving applications of "Yankee" spiral ratchet screw drivers, including the production of toys, typewriters, automobiles, trucks, filters, bicycles, cabinets, clocks, furniture, boxes, superchargers, metal doors, oil burners, and bus seats.

**Silver Alloy Brazing.** Handy & Harman, 82 Fulton St., New York 7, N. Y., has released a 28-page bulletin (No. 20) covering low temperature silver alloy brazing with "Easy-Flo" and "Sil-Fos." The bulletin explains where and how to use these alloys to best advantage, shows many interesting applications, and describes fast brazing techniques.

*It's not size  
but performance  
that counts!*



## K. R. WILSON ARBOR PRESSES

**Do 101 bending, straightening, offsetting jobs Better**

When it comes to doing a man-sized job, here's a "little man" that can't be beat! KRW Hydraulic Arbor presses are being used all across the country as full-size production tools. In addition to the standard bending, straightening, flattening and offsetting operations, KRW arbor presses combined with inexpensive dies can do hundreds of other operations formerly done on costly heavier equipment. What's more, they cut your manufacturing costs by releasing heavier, more expensive presses for larger work. KRW Hydraulic Arbor presses can be furnished for either vertical or horizontal ram travel. 25, 50, 60 and 75 ton capacities, either hand operated, air operated or motor driven.

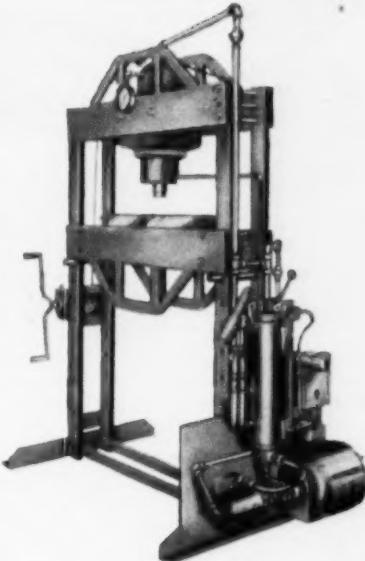
Let us know if you have any special problems that require a "custom made" press. Our engineers will tailor a KRW Arbor press to fit your needs exactly. Join the hundreds of manufacturers who have put KRW Arbor presses to work doing big jobs at low, low cost.

*Ask your local machinery dealer to quote you prices. Or write or wire Dept. 16 for full facts and prices.*

# K R WILSON

215 Main St.

Buffalo 3, N. Y.



*Illustrated is the 37MD1, motor driven arbor press, one of the full line of standard KRW presses available for immediate delivery.*

# SERVICES DIRECTORY

GRINDING • STAMPINGS • TOOL and DIE WORK  
MACHINE WORK • CASTINGS • HEAT-TREATING  
FORGINGS • EMPLOYMENT • BUSINESS • ETC.

## SWITCH



FROM CASTINGS  
LIKE THIS

TO NON-GRAN  
CENTRIFUGAL  
CASTINGS



• Eliminate Porosity!  
Improve Physical  
Properties!  
Request booklet.  
American Non-Gran  
Bronze Co.,  
Barwyn, Pa.

**CENTERLESS GRINDING** — Straight cylindrical, shoulder, profile and multiple diameters, any material analysis; also non-ferrous materials. Accurately ground taper pins and straight dowel pins. Brown & Sharpe and Swiss Automatic screw machine parts, heat treated and ground if necessary. Light bench type production drilling. Expanded facilities insure prompt and accurate service. Send blue prints or samples for estimates. The Porter Machine Co., 3139 Enyart Ave., Cincinnati 9, Ohio.

### Dovetail, Flat and Circular Form Tools, Reamers, Counterbores

Prompt, Efficient Service. Attractive Prices  
Send Your Inquiries to—

**ANDERSONS, INC.**

6603 W. Diversey Ave. Chicago 35, Illinois

### BAKELITE SILENT GEAR SERVICE

ALL SIZE BLANKS IN STOCK.  
Teeth Cut To Your Specifications.  
Prompt Delivery. Write for quotation.

### Greaves Machine Tool Co.

division of J. A. Fay & Egan Co.  
2009 Eastern Avenue Cincinnati, Ohio

### GRIND THE

### *Eastern Centerless Way*

Our new plant with  
increased  
facilities  
assures

### PROMPT SERVICE

**Eastern Centerless Grinding Co.**  
470 Tolland Street East Hartford 8, Conn.

### PATTERNS

Wood and Metal — also Match Plates.  
For all kinds of castings—large or small.  
*Estimates on Request.*

**GENERAL PATTERN WORKS**  
2231 Buck St., North of Harrison Ave.  
Phone MAIn 4751 Cincinnati, Ohio

### FOR SALE

New 22" HERCULES High Speed Precision Shaper arranged M/D with Universal Swivel Vise. Quotation Upon Request.

**PARKER MACHINE COMPANY, INC.**  
158 Pioneer Street Brooklyn 31, N. Y.

**WANTED—**  
**MORE STAINLESS STEEL  
& ALUMINUM**

Sheets • Strip • Wire • Rod  
Tubing  
Quotations given on your dead  
inventory.

**PROMPT REMOVAL—  
IMMEDIATE PAYMENTS**  
Dept. MS

**DEPENDABLE SALES CORP.**

Johnson & Gold Sts., Brooklyn 1, N. Y.

**STAMPINGS**  
**IN SMALL LOTS**

Precision Die Made  
Lowest Possible Cost

**DAYTON ROGERS MFG. CO.**  
**MINNEAPOLIS 7, MINN.**

**ADVERTISING RATES**  
for Services Directory  
SENT UPON REQUEST

**Write Modern Machine Shop**  
431 MAIN ST., CINCINNATI 2, OHIO

**Oil Groover.** A 12-page two-color catalog published by the Fischer Machine Co., 318 N. Eleventh St., Philadelphia 7, Pa., provides illustrations and detailed information on an oil groover for cutting a variety of grooves in bearings and for cutting keyways. Specifications and data on attachments are included.

**Lapping Machines.** A 16-page two-color illustrated catalog published by the Crane Packing Co., 1800 Cuyler Ave., Chicago 13, Ill., fully presents the line of "Lapmaster" lapping machines capable of generating surfaces of precision flatness and finish in short runs or in high production quantities. Information on special attachments and accessories is also included.

**Drill Heads.** A 28-page catalog issued by the U. S. Drill Head Co., Dept. C, 616-618 Burns St., Cincinnati 4, Ohio, includes illustrations and full descriptions of adjustable drill heads which are designed to permit drilling on close centers and which contain various numbers of spindles for reaming, facing, tapping, threading, and so on. Cross-section engineering drawings and installation illustrations are included.

**PANEL-BOARD NAME PLATES**

Made to Specifications.  
Pantograph Work. Steel and Brass  
Stamps.

Send sample or blueprint for estimate.

**FRANCIS ENGRAVING**  
Box 219, Rossmoyne, Ohio      5y 9351

**Abrasive Wheels and Discs** are fully covered in a 50-page pocket catalog released by Charles H. Besley & Co., 124 N. Clinton St., Chicago 6, Ill. Data on Titan abrasive wheels and discs and information on the advantage of making each wheel to fit individual production needs are presented. Tables of peripheral speeds at various r.p.m., maximum peripheral speeds for resinoid bonded abrasives, grades and markings, and a brief summary of the merits of resinoid bonds are also included.

**Hole Punching Units** for punching holes in  $\frac{1}{4}$ -inch thick mild steel are described and illustrated in a four-page bulletin (No. G) released by the Wales-Strippit Corp., 398 Payne Ave., North Tonawanda, N. Y. Specifications of complete units are included.

**Vertical Broaching Machine.** A 12-page two-color catalog (No. M-1706) published by Cincinnati Milling & Grinding Machines, Inc., Cincinnati 9, Ohio, describes and illustrates the No. 1-30 Vertical Hydro-Broach Machine available in either single or double ram models. Specifications and dimensional diagrams are included.

# WHERE TO GET IT



*Numbers shown are page numbers in this issue*

## A

- Abrasive Cloth, Paper, Discs, Belts, Stones.** Etc., 38, 39, 61, 87, 213, 230, 237
- Absorbents, Oil and Grease.** 122
- Adapters.** 204, 253
- Angle Plates, Magnetic.** 217
- Angles.** 74, 180, 264, 298
- Arbors.** 219

## B

- Balancing Machines.** 136, A, B, C, D, 282
- Balancing Ways.** 235
- Bar Feeds, Pneumatic.** 55
- Bases, Machine.** 218
- Battery Chargers.** 277
- Bearings, Ball.** 68
- Bearings, Sleeve.** 68, 153
- Bearings, Thrust.** 237
- Benches, Work.** 143
- Bending Devices.** 243
- Bending Machines.** 105, 301, 307
- Bins.** 143, 279, 293
- Bits, Power.** 204
- Blades, Cutting-Off.** 140
- Blocks, Magnetic.** 311
- Blocks, Step.** 254
- Blowers.** 234
- Bolts.** 82, 109, 197, 273, 308
- Bolt Threaders.** 311
- Books.** 311
- Boring and Turning Machines, Vertical.** 45
- Boring Bars.** 163
- Boring, Drilling and Tapping Machines, Multiple.** 24, 37, 40
- Boring Heads.** 75
- Boring Machines, Second Cover.**
- Boring Mills, Horizontal.** 333
- Boring Mills, Vertical.** 65
- Boxes, Shop.** 207, 233
- Brakes, Press and Bending.** 105, 244, 280
- Breaching Machines.** 8, 9, 169
- Bronze Bars.** 153
- Buffers, Portable Electric.** 78
- Buffers, Portable Pneumatic.** 78
- Buffing Machines.** 28, 29, 340
- Bushings, Drill Jig.** 84, 208, 220, 227, 235, 251, 271, 285, 288
- Bushings, Sleeve.** 153

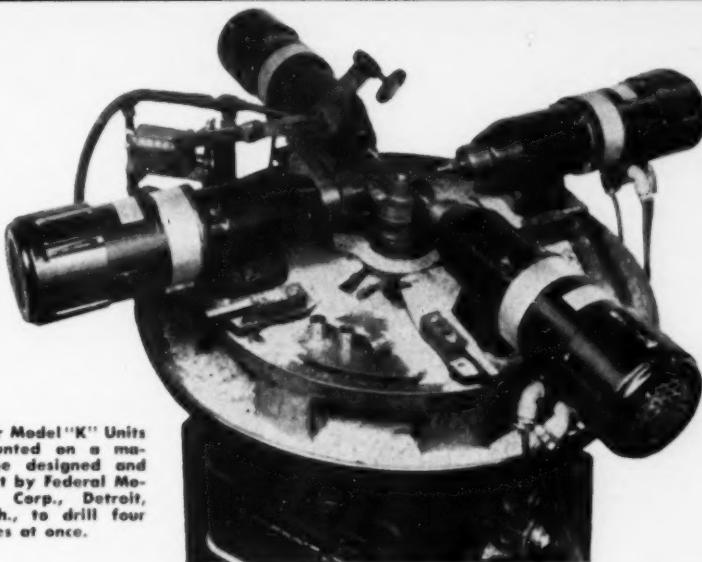
## C

- Cabinets.** 143
- Calipers.** 107, 252, 285
- Cams.** 251, 255, 253
- Centers, Lathe, Planer, Miller, Etc.** 207, 222, 241, 257, 286, 295, 298, 310
- Checking Rolls.** 235
- Chucking and Indexing Fixtures.** 145, 247
- Chucks, Collet.** 80, 163, 283
- Chucks, Drill.** 42, 43, 145
- Chucks, Lathe.** 80, 191, 199, 263, 283

- Chucks, Magnetic.** 60, 199
- Chucks, Tap.** 15, 145, 204, 267
- Chucks, Universal.** 199
- Clamps.** 50, 173, 227, 264, 271, 277, 320
- Clamps, Air.** 287
- Clinching Machines.** 87
- Coil Handling Equipment.** 255
- Collets.** 15
- Comparators.** 196, 201, 279
- Compressors, Air and Gas.** 18
- Controlling Devices.** 181
- Conveyors.** 188
- Coolants.** 113
- Coolant Separators.** 149
- Counterbores.** 117, 167
- Countersinks.** 156, 224
- Couplings.** 68
- Couplings, Flexible.** 194
- Cut-Off Machines.** 28, 29, 52, 133
- Cut-Off Wheels.** 267
- Cutter Sharpening Machines.** 8, 9, 258
- Cutters, Milling.** 87, 117, 135, 163, 167, 179, 195, 205, 221
- Cylinders, Hydraulic and Pneumatic.** 44, 72, 73, 87, 125

## D

- Demagnetizers.** 199, 207
- Diamond Wheels.** 170, 171
- Die Feeds.** 256
- Die Filers.** 269
- Die Lifting and Handling Machines.** 339
- Diemakers, Supplies.** 109
- Die Making Machines.** 85
- Dies.** 81, 167, 177, 183, 209, 249
- Die Sets.** 3, 57, 109, 239
- Dividing Heads.** 199, 263
- Dressing Fixtures, Grinding Wheel.** 213, 265, 273, 339
- Drill Heads.** 77, 132, 145, 214, 234, 269
- Drilling and Centering Machines.** 71
- Drilling Attachments.** 269, 300
- Drilling Machines, Bench.** 26, 28, 29, 33, 76, 274, 282, 313
- Drilling Machines, Horizontal.** 103, 285, 313
- Drilling Machines, Multiple Spindle.** 26, 28, 29, 132, 285
- Drilling Machines, Radial.** 10, 53, 103, 333
- Drilling Machines, Vertical.** 26, 28, 29, 33, 76, 103, 172, 285
- Drilling Units.** 172, 325
- Drills, Center, Core, Twist, Square, Etc.** 18, 117, 156, 167, 179, 187, 295, 308, 319
- Drills, Portable, Electric.** 18, 21, 78, 189, 340
- Drills, Portable Pneumatic.** 18, 28
- Drives.** 54, 253
- Drives, Motor.** 108, 185
- Drums, Grinding, Sanding, Etc.** 290
- Duplicating Machines.** 7
- Dust Control Equipment.** 19, 176, 207, 211
- Dye Penetrant Kits.** 294
- Dynamometers.** 282



Four Model "K" Units  
mounted on a machine designed and  
built by Federal Mogul Corp., Detroit,  
Mich., to drill four holes at once.

## How to Reduce Labor Costs!

USERS of Govro-Nelson Automatic Drilling Units are our authority for the somewhat startling statement that multiple drilling with our units has usually resulted in stepping up the production rate from 4 to 10 times, with a corresponding decrease in labor costs.

For example, on one Govro-Nelson installation, the present output of one operator is greater than the former output of three. Send for literature showing the possibilities of Govro-Nelson Units from the standpoint of reducing labor costs.

WRITE FOR  
*Literature*

**GOVRO-NELSON CO.**

*Machinists of Precision Parts  
for 27 Years*

1933 Antoinette, Detroit 8, Mich.

*Automatic DRILLING UNIT*

**E**  
**Engines. Diesel.** 18  
**Engraving Machines.** 233, 247, 259, 276  
**Envelopes.** 302  
**Etchers.** 207, 231, 276

**Feed Units.** 256, 268  
**Files.** 155, 275, 327  
**Files, Rotary.** 15  
**Filing Machines.** 250  
**Filters.** 41, 202  
**Finishing Machines. Abrasive.** 28, 29  
**Flame Hardening Apparatus.** 8, 9  
**Flexible Shaft Equipment.** 15, 77  
**Floats.** 257  
**Furnaces. Heat-Treating.** 36, 237, 309

**G**  
**Gage Blocks.** 186  
**Gages.** 6, 20, 70, 119, 186, 201, 219, 271, 279  
**Gear Cutting Machines.** 258  
**Gears and Gear Units.** 68, 83, 254, 261  
**Grinders. Abrasive Band and Disc.** 271  
**Grinders. Abrasive Belt.** 28, 29  
**Grinders. Air.** 25, 192, 202  
**Grinders. Bench.** 271, 277  
**Grinders. Carbide Tool.** 243  
**Grinders. Chip Breaker.** 243  
**Grinders. Cutter and Tool.** 12, 13, 85, 233, 240  
**Grinders. Cylindrical.** 337  
**Grinders. Die.** 270  
**Grinders. Drill.** 85, 233  
**Grinders. Face Mill.** 85  
**Grinders. Flute.** 184  
**Grinders. Internal. Second Cover.** 160, 337  
**Grinders. Jig.** 339  
**Grinders. Pedestal.** 19, 28, 29, 178, 340  
**Grinders. Portable and Tool Post.** 77, 340  
**Grinders. Portable Electric.** 18, 25, 77, 78, 270  
**Grinders. Profile.** 8, 9, 269  
**Grinders. Snagging.** 223  
**Grinders. Surface.** 4, 17, 63, 187, 203, 262, 337  
**Grinders. Swing Frame.** 250  
**Grinders. Tap.** 165  
**Grinders. Universal.** 12, 13, 85  
**Grinding Fixtures and Attachments.** 165  
**Grinding Wheels.** 63, 170, 171

**H**  
**Hammers. Air.** 274  
**Hammers. Impact.** 291  
**Hammers. Portable Electric.** 18  
**Hammers. Portable Pneumatic.** 18  
**Handles. Hammer.** 308  
**Handles. Machine.** 180, 271  
**Handwheels.** 180, 271  
**Hardness Testing Devices.** 157, 255, 278  
**Heating Units.** 225  
**Hinges.** 216, 275  
**Hoists.** 117, 167, 179  
**Holders. Grinding Wheel.** 63  
**Holders. Magnetic.** 318  
**Holders. Tool.** 88, 140, 182  
**Holders. Type.** 259  
**Hopper Units. Motorized.** 238  
**Hose Fittings. Air and Welding.** 41

**I**  
**Indexing Heads.** 314  
**Indicators.** 20, 107, 119, 127, 201

**J**  
**Jig Borers.** 14, 37, 101, 103, 339  
**Jigs and Fixtures.** 50, 81, 180, 219, 227, 246, 255, 271, 285  
**Joints. Universal.** 68, 194, 204, 253

**K**  
**Keys. Machine.** 259  
**Keys. Woodruff.** 259  
**Keyway Cutting Machines.** 242  
**Knives.** 127  
**Knobs. Machine.** 180, 254

**L**  
**Lapping Machines.** 248  
**Lathe Attachments.** 76, 283  
**Lathes. Automatic.** 23, 136, A, B, C, D  
**Lathes. Bench.** 28, 29, 76, 250  
**Lathes. Engine and Toolroom.** 28, 29, 32, 33, 45, 53, 58, 59, 62, 76, 245, 261, 299, 314, Third Cover  
**Lathes. Speed.** First Cover, 258  
**Lathes. Turret.** 76, 136, A, B, C, D  
**Layout Materials.** 146, 246, 304  
**Lighting Equipment.** 144, 306, 318  
**Lockers.** 143  
**Lubricators.** 41, 202

**M**  
**Magnifiers.** 259  
**Mandrels. Expanding.** 257, 273  
**Markers. Roll.** 259  
**Marking Machines.** 66, 152, 177  
**Metalizing Equipment.** 115  
**Micrometers.** 107  
**Milling Machine Attachments.** 75  
**Milling Machines. Automatic.** 161  
**Milling Machines. Bench.** 247, 256  
**Milling Machines. Hand.** 181, 193, 247  
**Milling Machines. Horizontal.** 8, 9, 16, 48, 49, 161, 261  
**Milling Machines. Turret.** 75  
**Milling Machines. Universal.** 8, 9, 16, 48, 49, 261  
**Milling Machines. Vertical.** 8, 9, 11, 257  
**Mills. End.** 117, 167, 312  
**Mills. Hollow.** 283  
**Mills. Midget.** 224  
**Motors.** 277  
**Mounted Points and Wheels.** 253

**N**  
**Nibblers.** 78, 242, 245  
**Notchers.** 105  
**Numbering Machines.** 177, 241  
**Nut Runners. Portable Pneumatic.** 78  
**Nuts.** 249, 253, 254, 273  
**Nuts. T.** 50, 254

**O**  
**Oil Groovers.** 160, 231  
**Oils. Cutting.** 8, 9, 292

**P**  
**Pantographs.** 7, 257  
**Parallels.** 74, 180, 262, 298  
**Parters. Rod.** 105  
**Parts. Machine. Aircraft. Production. Etc.** 18, 81, 160, 253



Pins, 22, 82, 109, 259, 265, 273  
Planers, 28, 29  
Plates, Screw, 179  
Plates, Surface, 74, 180, 246, 298  
Pliers, 289  
Plugs, Pipe, 197, Fourth Cover  
Plugs, Pressure, 22  
Presses, Air, 274  
Presses, Arbor, 257, 321  
Presses, Forging, 79  
Presses, Hydraulic, 46, 47  
Presses, Power, 114, 209, 210, 242, 243, 311  
Presses, Punch, 64, 136, 164, 242, 256  
Presses, Sub, 258  
Pulleys, 194  
Pumps, 79  
Pumps, Coolin' and Lubricant, 335  
Pumps, Hydraulic, 18  
Pump, Vacuum, 18  
Punches, 81, 105, 209, 236, 249  
Punch Press Feeds, 256  
Punch Press Sets, 254

#### **Q**

Quills, 77

#### **R**

Racks, Bar and Tube, 143, 233  
Racks, Storage Bin, 279  
Reamers, 117, 135, 163, 167, 179, 187, 224, 295  
Rectifiers, 181, 199  
Regulators, 41, 202  
Riveting Machines, 87, 110, 118, 245, 269  
Routers, 77

#### **S**

Sanders, Portable Electric, 18, 78  
Sanders, Portable Pneumatic, 18, 78  
Saw Blades, Band, 27, 107, 127, 168  
Saw Blades, Hack, 27, 107, 127, 168, 305  
Sawing Machines, Band, 27, 28, 29, 33, 166, 250, 263  
Sawing Machines, Circular, 28, 29  
Sawing Machines, Hack, 27, 86, 114, 199, 239  
Scalers, Portable, 166  
Scrapers, Hand and Power, 235  
Screw Drivers, Portable Electric, 18, 78  
Screw Drivers, Portable Pneumatic, 18, 78  
Screw Machines, Automatic, 40  
Screws, Cap. Set. Socket and Machine, 22, 50, 81, 82, 83, 109, 197, 226, 254, 273, 275, 308, Fourth Cover  
Screws, Lock, 227  
Screws, Transfer, 142, 302  
Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, Etc., 231, 241, 243, 322, 323  
Shapers, 28, 29, 34, 35, 76, 99, 114  
Shearing Machines, 105, 281, 316  
Shears, Portable Electric, 78  
Shears, Portable Pneumatic, 78  
Shelving, 143  
Shims, 108, 257  
Sockets, 204  
Spacing Collars, Arbor, 198  
Special Machinery, 56, 136, A, B, C, D, 145, 172, 180, 258  
Speed Reducers, 5  
Spindles, Grinding, 141, 253  
Springs, RZ, 109

Spring Winders, 265  
Sprockets, 68, 83  
Squares, 74  
Staking Machines, 110  
Stamps, 177, 249, 253, 259, 304  
Steel, Die, 329  
Steel, General Purpose, 329  
Steel Shaftings, 69  
Steel, Sheet, 329  
Steel, Stainless, 329  
Steel Stock, Ground Flat, 69, 107, 127, 329  
Steel, Tool, 57, 329  
Step Block Sets, 254, 300  
Stools, 143  
Straightedges, 298  
Straightening Machines, 235  
Studs, 273, 308  
Stud Sets, 254, 300  
Stud Setters, 204  
Superfinishing Machines, 136, A, B, C, D  
Surfacing Machines, Abrasive, 33  
Switches, 199

#### **T**

Tables, Elevating, 123  
Tables, Rotary and Index, 172, 212, 239, 271, 304  
Tachometers, 207  
Taper Attachments, 234  
Tapes, Measuring, 107, 127  
Tap Extractors, 162  
Tap Guides, 267  
Tappers, Hand, 267  
Tappers, Portable Electric, 18  
Tappers, Portable Pneumatic, 18  
Tapping Heads, 15, 145, 220, 234, 269, 285, 303  
Tapping Machines, 145, 254, 267, 285  
Tapping Units, 172  
Taps, 6, 15, 116, 167, 183, 187, 260  
Threading Machines, 2, 51  
Thread Rollers, Automatic, 137  
Tires, 212  
Tool Blanks, 81  
Tool Cribs, 251  
Tool Post, Turret, 163  
Tools, Boring, 134, 281  
Tools, Bottoming, 281  
Tools, Carbide, 30, 31, 147, 179, 221, 285  
Tools, Chamfering, 224, 251  
Tools, Deburring, 224, 251  
Tools, Facing, 134, 281  
Tools, Form, 295  
Tools, Internal Threading, 134, 281  
Tools, Radius, 229  
Tools, Special Cutting, 117, 163, 167, 180, 295  
Traps, 257  
Turrets, Drill, 111

#### **V**

Valves, 41, 44, 215, 257, 272, 287  
Vises, Bench and Machine, 75, 148, 199, 200, 220, 271, 277, 302

#### **W**

Wear Parts, 81  
Welding Equipment and Supplies, 28, 29, 232  
Work Feeders, Pneumatic, 274  
Wrenches, 204, 289  
Wrenches, Portable Electric, 78  
Wrenches, Portable Pneumatic, 78

# News about steel

FROM U-S STEEL SUPPLY



## What effect will "Mobilization Economy" have on steel supplies?

● Our economy is now entering an extended period unlike any other in our history. During this period, industrial efforts will be divided between building an adequate defense machine and maintaining our high standard of living. Industries working on government defense orders will have "DO" priority ratings and get first call on critical steels. Steel distributors will replenish their inventories by passing these defense orders along to steel producers.

Under these circumstances, if you do not have a "DO" priority rating you may have difficulty obtaining certain steel items essential to defense. Substitute steels can frequently be employed, but you may need help in locating suitable material.

**Here's how to get the help you need:** Call in a United States Steel Supply Company representative. He will do his best to locate the type of steel your work requires. That's his job . . . to give you the best *service* possible, whatever the circumstances.

WHEN YOU DEAL  
WITH US, YOU GET  
Service  
Plus!

**UNITED STATES STEEL  
SUPPLY COMPANY**



Warehouses and Sales Offices:

BALTIMORE • BOSTON • CHICAGO • CLEVELAND • LOS ANGELES  
MILWAUKEE • MOLINE, ILL. • NEWARK • PITTSBURGH • PORTLAND, ORE.  
SAN FRANCISCO • SEATTLE • ST. LOUIS • TWIN CITY (ST. PAUL)  
Sales Offices: INDIANAPOLIS • KANSAS CITY, MO. • PHILADELPHIA  
ROCKFORD, ILL. • TOLEDO • TULSA • YOUNGSTOWN

Headquarters Offices: 208 S. La Salle St. — Chicago 4, Ill.

UNITED STATES STEEL

---

## Over The Editor's Desk

---

### Eternal Vigilance

**T**HE results of the elections of November 7, 1950, were encouraging; they proved that the American people are still capable of vision which extends beyond tomorrow. They proved that the American sense of responsibility has not yet been deadened by political hand-outs to a point where the people will fail to recognize Socialism, even in the sheep's clothing of "welfare."

Not that the battle has been won; it won't be won for many more elections, if ever. Our country will be safe only when it is in the hands of statesmen; the American people can never breathe easily again as long as our government is headed and controlled by politicians who place their own interests first and those of the nation second. "Eternal vigilance is the price of peace", and no man can feel that he is at peace with the world when there is an ever-increasing mortgage on the old homestead.

The mortgage on our U. S. A. "homestead" is now more than 257 billion dollars, and every year that the Truman government is in control, this debt is increased. The federal government operated at a deficit in 18 out of the past 20 years, and President Truman damned the Congress which refused to add to the debt during those two years. It is true that this debt could be paid off with 57 cent dollars, but it is also true that our income today is counted in those same 57 cent dollars.

Dangerous as the threat of Socialism is to our American way of life, it is no more dangerous than the threat of inflation. The life blood of American commerce and industry—of the very nation itself—is its monetary system, and inflation, like a huge cancer, is slowly and surely destroying the health of the nation. Outwardly, the nation appears to be in top form. With practically full employment and the highest wages the world has ever known, America appears to be enjoying unprecedented prosperity. An analysis of this prosperity reveals that it is largely superficial.

In a conversation between one of our editors and a labor union delegate from Seattle to a labor convention at Detroit recently, the mechanic stated that although wages today are more than double what they were fifteen years ago, he would rather have the wages and prices back where they were fifteen years ago. He said that in those days he could pay his bills and buy a week's groceries and still have money left with which his family could enjoy outings, theaters, and other of the good things of life. He said, "Today I am getting more than double the wages I drew then, and when my bills are paid I have nothing left."

He has discovered what hundreds of thousands of other workers have yet to discover—that although their wages are high, living costs are just as high as their wages are, and the constant demand for higher and ever higher wages results, in the end, in nothing but a cheaper dollar.

This is today's battle—to defeat inflation. Last summer Bernard Baruch—still one of the ablest thinkers in this country—pointed out that the only way to keep inflation from spreading further would be to put controls on prices and wages immediately. But President Truman, at the behest and under the control of the leaders of the great labor unions, held off so that these unions could obtain further wage increases before any controls were applied. There has been a rush by the union leaders for wage increases for their members all through these past several months. But the union member who received a wage increase of up to 20% should realize that during the past

4½ months commodity prices have increased approximately 25%. This means that the purchasing power of the dollar has been decreased by 20%.

It takes \$5 to buy now what \$4 would have bought in late April and early May of this year. The union member who received a wage increase enjoyed the benefit of this increase, perhaps, for a few days, then increased prices, due largely to the continuous demands for wage increases, caught up with him. The most important effect of this continuous round of wage demands has been a constant decrease in the value of the dollar. A continuation of these policies would, in the end, mean the complete ruin of our national currency.

Now the purchasing power of the dollar is about to be devalued further due to government deficit spending to finance the new programs for national defense, mutual aid assistance to European nations, and general aid and assistance to countries all over the world. The cost of the government for the calendar year 1951 will, according to minimum estimates, exceed 81 billion dollars.

To raise this almost unbelievable amount the taxes which will of necessity have to be levied will take approximately every third dollar of national income. This money must be raised in either one of two ways; either by additional taxes now, or by borrowing by means of government bonds and other methods which will defer the actual cost to some future date—possibly far enough into the future so that our children and grandchildren will have to pay our debt.

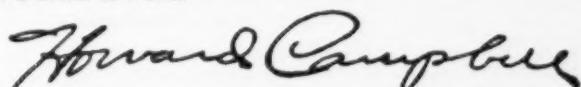
To many people the statement that our public debt is more than 257 billion dollars is just a meaningless recital of figures. Many people think that this debt is held by the banks and big corporations of the nation. It might be interesting to present some figures showing who really holds this debt.

As of June 30, 1949, the public debt, then at \$250,800,000,000, was handled as follows: by commercial banks, \$63,000,000,000; by Federal Reserve banks, \$19,-300,000,000 by individuals, \$68,000,000,000, by insurance companies, \$20,900,000,000; by State and local governments \$8,000,000,000; by mutual-savings banks, \$11,600,000,000; by corporations and associations, \$21,600,000,000; by the United States Government trust funds such as civil service retirement fund, Federal old-age and survivors trust fund, railroad retirement account and unemployment trust fund, \$38,400,000,000.

Every dollar held by the United States government in these trust funds has already been spent and the security for this money consists of government IOU's, which will have to be paid by the people again in the form of further taxes. With the dollar value collapsing from month to month, the beneficiaries of these trust funds will be paid off in devalued dollars, a system of skillful robbery achieved by inflation accelerated by deficit financing for 18 out of the past 20 years.

Inflation is systematically and continually robbing the millions of men and women who have savings accounts, and the millions who have investments in building and loan associations and insurance policies. It is easy for the government to rob the people when there is no standard by which the value of our currency can be set.

Until 1933 the value of American currency was predicated upon the value of gold at \$20.60 per ounce. Then President Roosevelt wanted more money to finance his "welfare" programs and he repriced gold at \$35 per ounce. In so doing he made a profit for the government of two billion dollars. Two billion dollars to play with in financing his various schemes—but two billion dollars taken at one stroke of the pen out of the pockets and savings of the American people. Only when United States currency is based on a definite standard, such as gold, will we ever again know from one minute to the next what a dollar is worth.



*There's One in Every Shop*

By Patterson



"I hired her during the war --- I was so darn  
sick of shortages!"

**at the comfort level  
you can see what you're doing**



THE CINCINNATI  
**GILBERT**  
MACHINE TOOL COMPANY

RADIALS • HORIZONTAL BORING MILLS • ACCESSORIES

Notice the "wide angle visibility" the Gilbert radial operator has with the head at the "comfort level": (most convenient working height). It means better, faster work and less operator fatigue. You see, in the Gilbert-type head the spindle and the controls are closer to the arm, and the head is normally above the operator's convenient view of the work. So, for a given work height, the Gilbert arm is lower than usual. Deflection is reduced. Accuracy is improved. Dozens more design refinements make Gilbert radials do more work and pay a higher return on your investment. For full information on this machine see Bulletin 349. Write for it today, on your letterhead, please. The Cincinnati Gilbert Machine Tool Co., 3360 Beekman Street, Cincinnati 23, Ohio.

**THOSE WHO BUY GILBERT BUY GILBERT AGAIN**

# INDEX TO ADVERTISEMENTS

**A**

Aber Engr. Works, Inc.	205
Abrasive Products, Inc.	230
Accurate Bushing Co.	227
Ace Drill Bushing Co.	229
Ace Tool & Die Works	136
Acme Industrial Co.	265
Acme Tool Co.	235
Acme Wire & Iron Works	251
Acorn Bearing Co.	237
Acromark Co.	152
Adams Co.	83
Aget-Detroit Co.	176
Allied Products Corp.	81
American Drill Bushing Co., Inc.	285
American Non-Grau Bronze Co.	322
American Pipe Bending Machine Co., Inc.	367
American Steel Foundries, King Machine Tool Div.	45
American Swiss File & Tool Co.	275
American Tool Works Co.	53
Ames Co., B. C.	201
Ames Precision Machine Works	278
Anderson Bros. Mfg. Co.	235
Andersons, Inc.	322
Apex Machine & Tool Co.	204
Armstrong-Blum Mfg. Co.	27
Armstrong Bros. Tool Co.	88
Arter Grinding Machine Co.	337
Atlantic Gear Works	254
Auto Engraver Co., Inc.	257
Auto Moulding & Mfg. Co.	275
Automatic Steel Products, Inc.	254
Automatic Valve, Inc.	272
Avey Drilling Machine Co.	172, 212

**B**

Baldor Electric Co.	277
Barber-Colman Co.	135
Barnes Drill Co.	149
Baumbach Mfg. Co., E. A.	239
Bay State Abrasive Products Co.	61
Bay State Tap & Die Co.	183
Benchmaster Mfg. Co.	256
Besly & Co., Charles H.	187
Beverly Shear Mfg. Co., Inc.	281
Black & Webster, Inc.	291
Blair Tool & Machine Corp.	255
Blanchard Machine Co.	63
Bliss Co., E. W.	311
Bloomfield Tool Corp.	263
Boston Gear Works	68
Boyar-Schultz Corp.	4
Boye & Ennies Machine Tool Co.	261
Brewster Squires Co.	231
Bridgeport Machines, Inc.	75
Brighton Screw & Mfg. Co.	226

Brown Engr. Co.	233
Brown & Sharpe Mfg. Co.	48, 49
Bryant Mehry, & Engr. Co.	37
Buck Tool Co.	80
Buckeye Tools Corp.	78
Buffalo Dental Mfg. Co.	234
Buffalo Forge Co.	26
Bullard Co.	65
Busch Co., J. C.	298

**C**

Carboloy Co., Inc.	30, 31
Carlton Machine Tool Co.	10
Carroll & Jamieson Machine Tool Co.	314
Carter Products Co.	212
Chicago Dial Indicator Co.	26
Chicago Pneumatic Tool Co.	18
Chicago Rivet & Machine Co.	118
Chicago Screw Co.	273
Chicago Tool & Engr. Co.	304
Chicago Wheel & Mfg. Co.	252
Cincinnati Bickford Tool Co.	103
Cincinnati Electrical Tool Co.	340
Cincinnati Gilbert Machine Tool Co.	333
Cincinnati Lathe & Tool Co.	12
Cincinnati Milling Machine Co.	8, 9
Cincinnati Milling Products Div., Cincinnati Milling Machine Co.	113
Cincinnati Shaper Co.	99
Circular Tool Co., Inc.	156
Clark Instrument, Inc.	255
Clemson Bros., Inc.	168
Cleveland Punch & Shear Works Co.	269
Colonial Bushings, Inc.	251
Comet Tool Co.	134
Commander Mfg. Co.	269
Commercial Centerless Grinding Co.	231
Contor Co.	279
Continental Machine Co.	267
Cook, Inc., L. H.	308
Crane Packing Co.	248
Crucible Steel Co. of America	67

**D**

Dahlistrom Mfg. Co.	267
Dakon Tool & Machine Co., Inc.	310
Dandy Machine Specialties, Inc.	169
Dayton Rogers Mfg. Co.	323
Dearborn, J. W.	247
Delaware Tool Steel Corp.	309
Delta-Rockwell Power Tool Div.	28, 29
Denison Engr. Co.	46, 47
Dependable Sales Corp.	323
Detroit Die Set Corp.	82
Detroit Power Screwdriver Co.	228
Detroit Stamping Co.	198
DeVlieg Machine Co.	101

RUTHMAN  
**GUSHER**  
MACHINE TOOL  
COOLANT PUMPS

The Right Way  
to Higher Profits  
**FOR YOU!**

You're protecting your production and profits when you use Ruthman Gusher Coolant Pumps on your metal-cutting machinery. Ruthman Gusher Pumps offer you an advanced design that assures you superior performance under the demands of stepped up production. And you know when it's a Ruthman Pump, it's built to last.

Write us today. There's a Gusher type and model to fit your coolant problem.

## THE RUTHMAN MACHINERY CO.

1817 READING ROAD

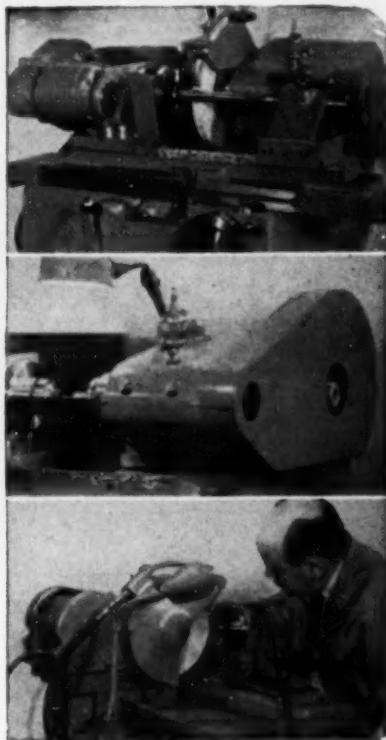
\*

CINCINNATI 2, OHIO



## Index to Advertisements

Dreis & Krump Mfg. Co.	244	<b>J</b>	
Dremel Mfg. Co.	279	J & S Tool Co., Inc.	173
Dunmore Co.	77	Jacobs Mfg. Co.	42, 43
Dy-Chek Co., Div. of Northrup Aircraft	294	Jarvis Co., Charles L.	15
Dykem Co.	146	Johnson Bronze Co.	153
<b>E</b>			
Eastern Centerless Grinding Co.	322	Johnson Gas Appliance Co.	237
Eclipse Counterbore Co.	54	Johnson Mfg. Corp.	196
Economy Machine Products Co.	275	<b>K</b>	
Economy Tool & Machine Co.	271	Kearney & Trecker Corp.	16
Edroy Products Co.	258	Kennametal, Inc.	221
Kister Engr. Co., Inc.	243	Kent Machine Co.	311
Electro-Matic Products Co.	181	King Machine Tool Div., American Steel	
Electro-Mechano Co.	313	Foundries	45
Enco Mfg. Co.	318	Knight Mchry. Co., W. B.	11
Errington Mechanical Laboratory, Inc.	229	<b>L</b>	
Esen Engr. Corp.	255	L-W Chuck Co.	199
Etco Tool Co., Inc.	145	Landis Machine Co.	2
<b>F</b>			
Falls Products, Inc.	241	Landis Tool Co.	12, 13
Farrel-Birmingham Co., Inc.	5	Lapeer Mfg. Co.	320
Federal Press Co.	210	LeBlond Machine Tool Co., R. K.	Third Cover
Federal Products Corp.	119	Lee Co., K. O.	249
Federal Tool & Mfg. Co.	304	Lees-Bradner Co.	51
Fischer Machine Co.	231	Lepel High Frequency Laboratories, Inc.	225
Foote-Burt Co.	169	Lima Electric Motor Co.	185
Fosdick Machine Tool Co.	14	Lincoln Electric Co.	232
Francis Engraving Co.	323	Lindbergh Engr. Co.	125
Fulfin Specialties Co., Inc.	215	Linley Bros. Co.	245
<b>G</b>			
Galland-Henning Mfg. Co.	44	Lipe-Rollway Corp.	55
Gardner Machine Co.	17	Littleford Bros., Inc.	218
General Pattern Works	322	Lovejoy Flexible Coupling Co.	194
George-Anderle Mfg. Co.	246	Luers, J. Milton	140
Gisholt Machine Co.	136 A, B, C, D	Lyon Metal Products Co.	143
Gorton Machine Co., George	7	<b>M</b>	
Govin-Nelson Co.	225	M-B Products	202
Grant Mfg. & Machine Co.	268	Machine Products Corp.	189
Gray Machine Co.	242	Madison-Kipp Corp.	192
Greaves Machine Tool Co.	261, 272	Marvel Tool & Machine Co.	257
Greenlee Bros. & Co.	40	Master-Taper Co.	234
Greenlee Tool Co.	243	McCrosky Tool Corp.	163
Grinders & Fixtures, Inc.	314	McDonough Mfg. Co.	223
Grob Bros.	250	Mead Specialties Co.	274
Grobet File Co. of America	327	Metallizing Engr. Co., Inc.	115
<b>H</b>			
Hall Mfg. Co.	283	Metzgar Co.	188
Hamilton Tool Co.	123	Meyers Co., Inc., W. F.	208
Hammond Mchry. Builders, Inc.	19, 243	Michigan Chrome & Chemical Co.	304
Hanchett Mfg. Co.	273	Michigan Drill Head Co.	132
Hanson Whitney Co., Div. of Whitney Chain Co.	6	Mico Instrument Co.	247
Hardinge Brothers, Inc.	First Cover	Miller Knuth Mfg. Co.	279
Hartford Special Mchry. Co.	137	Miller Motor Co.	72, 73
Hartmann Mfg. Co.	302	Millers Falls Co.	305
Heald Machine Co.	Second Cover	Mitchell Co., E. C.	237
Heimann Mfg. Co.	142	Modern Machine Tool Co.	133
Hendey Machine Co.	32	Monarch Machine Tool Co.	58, 59
High Speed Hammer Co., Inc.	109	Montgomery & Co., Inc.	264, 265
Hjorth Lathe & Tool Co.	259	Moore Special Tool Co., Inc.	329
Hoggson & Pettis Mfg. Co.	249	Morris Machine Tool Co.	21
Holo-Krome Screw Corp.	Fourth Cover	Match & Merryweather Mchry. Co.	56
Howe & Pant, Inc.	111	Motor Tool Mfg. Co.	229
<b>I</b>			
Ideal Industries, Inc.	267	Mummert-Dixon Co.	256
Industrial Products Suppliers	267	<b>N</b>	
Inter-Continental Trading Corp.	252	National Machine Tool Co.	148
		National Tool Co.	196
		National Twist Drill & Tool Co.	117
		Nebel Machine Tool Co.	245
		New Hermes, Inc.	276
		New Method Steel Stamps, Inc.	259
		Nichols Engr. Co.	108
		Nichols-Morris Corp.	161



## ARTER

MODEL No. 103

**A relatively low-priced machine for cylindrical,  
internal, end or surface grinding.**

The ARTER Model No. 103 grinder can be purchased as a combination machine for the classes of work illustrated, or it can be purchased just for cylindrical jobs, or for internal work. Many of these machines are being used for tool room work or as auxiliary equipment to take the overload of higher priced machines.

**Capacities:** With internal head— $\frac{1}{8}$ " to 3" dia. x 4" long.  
With external head—3" dia. x 10" long. Swing over table 9".

**ARTER**  
**GRINDING MACHINE CO.**  
WORCESTER, MASSACHUSETTS • U. S. A.

## Index to Advertisements

Nicholson & Co., W. H.	257	Speedgrip Chuck, Inc.	191
Nicholson File Co.	155	Spengler Co., Geo. H.	249
Nielsen, Inc.	298	Stackbin Corp.	279
Nielsen Tool & Die Co.	302	Standard Gage Co., Inc.	70
Nobis & Westbrook Mfg. Co.	66	Standard Pressed Steel Co.	22, 249
Nobur Mfg. Co.	251	Standard Steel Specialty Co.	259
Norgren Co., Inc., C. A.	41	Standard Tool Co.	167
Northwestern Tool & Engr. Co.	254	Stanley Electric Tool Div.	189
Norton Co.	38, 29, 179, 171	Staples Tool Co.	295
Nu-Matic Grinders, Inc.	296	Starrett Co., The L. S.	107, 127
Numberall Stamp & Tool Co.	241	Sterling Factory Equipment Co.	293
O			
OK Tool Co.	195	Stone Mchry. Co.	52
Oliver Instrument Co., Inc.	85	Stuart Oil Co., D. A.	292
Oliver Machinery Co.	263	Sturdimatic Tool Co.	286
O'Neill-Irwin Mfg. Co.	105	Sundstrand Machine Tool Co.	71
Ottmiller Co., Wm. H.	308	Syntron Co.	268
P			
PTI, Inc.	285	T	
Parker-Kalon Corp.	197	Taft-Pelce Mfg. Co.	74
Parker Machine Co., Inc.	322	Tamms Industries, Inc.	122, 246
Pedrick Tool & Machine Co.	301	Taylor Dynamometer & Machine Co.	282
Pittsburgh Stamp Co., Inc.	253	Teeter, C. B.	229
Pivot Punch & Die Co.	236	Thomas Hoist Co.	263
Pope Mchry. Corp.	141	Thriftmaster Products Corp.	234
Porter Machine Co.	322	Tietzmann Tool Corp.	300
Preis Engraving Machine Co., H. P.	233	Tomkins-Johnson Co.	87
Prochner Safety Chuck Co.	303	Torit Mfg. Co.	211
Production Devices, Inc.	200	Trokys Mfg. Co.	239, 263
Producto Machine Co.	57	Twentieth Century Mfg. Co.	144
Q			
Queen City Machine Tool Co.	178	U	
R			
R. H. Tool Co., Inc.	281	Union Twist Drill Co.	179
Racing Tool & Machine Co.	86	U. S. Drill Head Co.	214
Reading Machine Co.	242	U. S. Electrical Tool Co.	223
Reid Bros. Co., Inc.	262	U. S. Machine Tool Co.	247
Reid Tool Supply Co.	271	U. S. Steel Supply Co.	329
Republic Steel Corp.	69	Universal Engr. Co.	288
Revere Fisher Engr. Co.	84	Universal Transfer Punch, Inc.	262
Rice Pump & Machine Co., Inc.	269	Utica Drop Forge & Tool Corp.	289
Rivett Lathe & Grinder, Inc.	283	V	
Robbins Co., Omer E.	217	V & O Press Co.	243
Roberts Rubber Co., Weldon	213	Van Products Co.	220
Rockford Machine Tool Co.	34, 35	Vascoloy-Hamet Corp.	147
Rodgers Hydraulics, Inc.	79	Verson Alsteel Press Co., Inc.	286
Rotor Tool Co.	25	Victor Mchry. Exchange, Inc.	319
Rouse & Co., H. B.	193	Vimeo Mfg. Co.	306
Royal Oak Tool & Machine Co.	165	W	
Ruleta Co., Inc.	255	Wade Instrument Co.	302
Ruthman Mchry. Co.	335	Walker Co., Inc., O. S.	60
Rutland Tool Service	241	Walker-Turner Div., Kearney & Trecker Corp.	33
S			
S & S Hinge & Metal Products Co.	216	Walls Sales Corp.	271
Sales Service Machine Tool Co.	114	Waltham Machine Works	258
Sanford Mfg. Co.	203	Walton Co.	162
Savage Co., W. J.	245	Wardwell Mfg. Co.	184
Schauer Mfg. Corp.	258	Watts Bros. Tool Work	308
Scherr Co., Inc., George	311	Webber Gage Co.	186
Schlecht & Son, L. G.	251	Weldon Tool Co.	312
Schmidt, Inc., Geo. T.	117	West Point Mfg. Co.	56
Schrader's Son, A.	287	Western Tool & Mfg. Co.	273
Seibert & Sons Inc.	253	Whistler & Sons, Inc., S. B.	3
Seneca Falls Machine Co.	23	Whitney Metal Tool Co.	316
Sentry Co.	36	Wicaco Machine Corp.	160
Service Machine Co.	164	Wiedemann Machine Co.	64
Services Directory	322, 323	Wilson, K. R.	321
Severance Tool Industries, Inc.	224	Wilson Mechanical Instrument Co.	157
Sheldon Machine Co., Inc.	299	Wilton Tool Mfg. Co.	277
Skilaw, Inc.	21	Winter Bros. Co.	116
Smith Tool & Engr. Co.	246	Wirth & Son, Inc., Carl	283
Snow Mfg. Co.	285	Wood & Spencer Co.	260
South Bend Lathe Works	76	Woodworth Co., N. A.	219
Z			
Zeh & Hahnenmann Co.	242		
Ziegler Tool Co., W. M.	182		

# Now you can combine roll-crushing and diamond dressing in a single wheel dresser to speed form grinding

Before the development of the Moore Panto-Crush Wheel Dresser, diamond dressing and crush-forming of surface grinder wheels called for the use of separate devices. These required considerable set-up and operating skill, particularly where odd contours other than true radii and straight surfaces are involved.

Now with the Moore, permanently mounted on the wheel spindle of a surface grinder, both crush-forming and diamond-dressing are accomplished in a single mechanism.

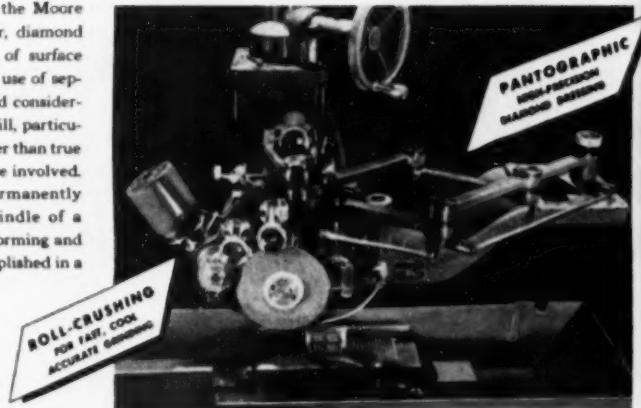
Here's how this 2-in-1 machine does it:

**1. Combines Pantograph,** working directly from template, and Roll-Crushing in one device, accurately related to spindle.

**2. Switches from one method to the other** without disturbing workplace setting or location of either truing device.

**3. No setting up of complex attachments** each time wheel is dressed... no raising of wheel spindle from work to dress, yet wheel spindle may be raised or lowered without losing relation of wheel form to dressing device... crusher method never diamond costs.

**4. Assures highest roll-crushing accuracy and economy.** Crusher roll is ground and used on same spindle, without disturbing position... no expensive machine required to grind crusher roll... no worry about hardening distortion, because roll is ground in place from the solid directly from template.



**5. Takes Skill out of job,** yet adds advantage of crush dressing for heavy cuts without heating work, and ultra-precision diamond dressing.

**6. Device need not be removed** to use machine as conventional surface grinder.

Both MACHINE DESIGN and MACHINERY magazines devoted considerable editorial space to technical discussions of the value of this ingenious new mechanism. We'll be glad to send you reprints and a descriptive catalogue on Panto-Crush.

**MOORE SPECIAL TOOL CO., Inc.**  
730 UNION AVENUE, BRIDGEPORT 7, CONN.



HAVE YOU BOUGHT  
YOUR COPY OF  
'PRECISION  
HOLE LOCATION'?

Over 5,000 copies of this valuable book on toolmaking practices have been sold to date. Available at special price of \$3 in U. S. A.; \$3.50 outside U. S. A. 448 pages, over 400 illustrations. 184 pages of Woodworth Coordinate Location Tables from 3 to 100 holes. Send check or money order to Moore Special Tool Co., Inc., Bridgeport 7, Conn.

## ADD TO YOUR TOOLROOM

ZIG BORERS • ZIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • MOTORIZED CENTERS • HOLE LOCATION ACCESSORIES

# A REAL GRINDER and a **REAL BARGAIN**

**PEDESTAL TYPE \$171.00**

**BENCH TYPE \$132.00**

- Full 1 H.P. Motor
- Two 10"x 1" Grinding Wheels
- Exhaust Outlets on Wheel Guards
- All Angle Tool Rests
- Fabricated Steel Pedestal
- 20" Between Wheels
- Ball Bearing Construction

**WRITE** for name of nearest distributor or Bulletin 30 MA

MFRS. OF DRILLS, GRINDERS, BUFFERS AND PORTABLE TOOL.

TRADE

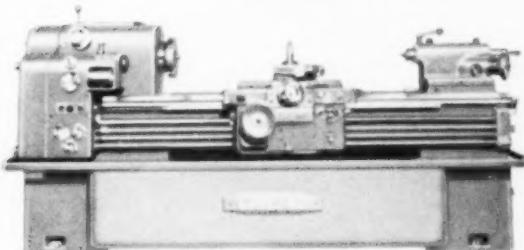
MARK

*The Cincinnati*  
**THE CINCINNATI ELECTRICAL TOOL CO.**  
Division of THE R. K. LEBLOND MACHINE TOOL CO.  
CINCINNATI 8, OHIO, U. S. A.



**you don't need**

**attachments  
to do most toolroom jobs  
on the ...**



**LEBLOND RT TOOLROOM LATHE**

*Standard features of LeBlond's RT replace most toolroom attachments, eliminate a bushel of change gears.*

**And you save hours of set-up time!**

Just flick levers and turn dials to get spindle speeds as low as 6, as high as 1500 r.p.m. Make simple, quick adjustments for coarse threads down to 4° lead—American, diametral, module and metric pitch threads. RT also gives you exclusive, 4-directional rapid traverse to make *every* job easier.

The most versatile taper equipment in the business may be specified (at extra cost) with your new RT—to give you steep tapers up to 50° included, shallow tapers up to 48° long.

LeBlond also builds the RT in a 16" Engine model.

Sixty-three years of machine tool leadership stand behind LeBlond's complete line of 76 lathe models to give you day-in, day-out dependability. Your LeBlond Distributor will tell you about the RT and other models. Call him or write—

THE R. K. LEBLOND MACHINE TOOL CO., CINCINNATI 8, OHIO

Sales offices  
In New York,  
Chicago,  
Detroit

**LeBLOND**  
*RT Toolroom*

*World's largest builder of a  
complete line of lathes*

**RT**

**built-in features**

- 4-directional rapid traverse
- Combination belt and gear drive
- Automatic chasing stop
- Reverse to leadscrew at apron
- Single-lever positive-jaw feed control
- Automatic lubrication through headstock, feed-box, apron

**toolroom lathe**

- Variable speeds—  
6 to 1500 r.p.m.
- 90 feeds—0007" to 2.064"
- 90 threads— $\frac{1}{4}$  to 120,  
American, module,  
diametral, metric
- Start-stop-reverse spindle control at apron
- 7½ horsepower motor

**engine lathe**

- 16 speeds—30 to 1537 r.p.m.
- 60 feeds—0013" to 230"
- 60 threads—2 to 120
- 15 horsepower motor

PERFORMANCE GUARANTEED



## HOLO-KROME

*Completely Cold Forged*

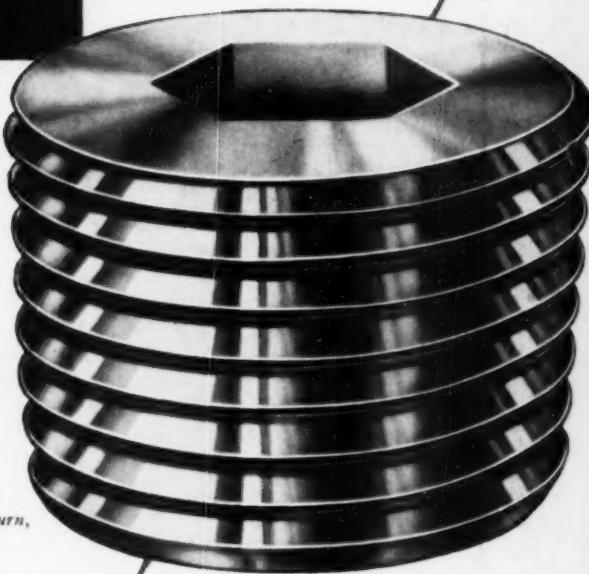
## Socket PIPE PLUGS

UNIFORM SOCKET DEPTH — True hex shape, clean taperless walls, eliminates socket deformation under high wrenching torque.

CLOSER TOLERANCES — Held to *one-half turn*, plus or minus, on finest ring gages.

ACCURATE THREADS — Checked for lead, pitch — Clean and sharp — Held to standard specifications.

GREATER STRENGTH — *Completely cold forged* of special analysis alloy steel and scientifically heat treated. Also available in metals other than standard alloy.



• Available from Holo-Krome  
Authorized Industrial Distributors

## HOLO-KROME

*Completely Cold Forged*  *Socket Screw Products*

THE HOLO-KROME SCREW CORP., HARTFORD 10, CONN.